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Note.—Initialled abstracts are written by the following:—

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* General studies, see also individual crops.

Plant Breeding Abstracts.

Vol. XIII, No. 2.

Part 1. Empire Section

BREEDING 575

377. **Scottish Society for Research in Plant-Breeding. Report by Director of Research. I. Research Programme.** Rep. Scot. Soc. Res. Pl. Breed 1942 : Pp. 33. 575:633(41)

Wheat.

A few lines of "Triticale" wheat-rye hybrids from U.S.A. showed they may prove hardier than winter wheat.

Oats.

Aims at selection of strains of high yield which are resistant to lodging. Strains resistant to prompt germination in autumn were also selected from crosses between the wild and cultivated oat.

Barley.

Tetraploid seedlings of barley obtained by colchicine were grown and successfully seeded.

Root Crops.

The main purpose of the experiments with swedes was the examination of various methods for selection and comparison of individual plants intended for use in breeding. Self-fertilization in pollen-proof bags produced no marked deterioration through inbreeding.

Potatoes.

Genetical evidence shows that there exist several different levels of resistance in potatoes to *Phytophthora infestans*. *S. demissum* has been used most successfully as a source from which to introduce genes for resistance. This work was combined with breeding for virus A and X and investigations for production of leaf-roll resistant varieties. The exploration of wild material for resistance to virus has been started and further genetic studies made on the inheritance of genes Na, Nb, Nc and Nx for controlling the hypersensitive necrotic reaction on which immunity from virus infection depends. Strong linkage between the Na and Nx genes was confirmed. E. K. J.

GENETICS 575.1

378. **MATHER, K. Polygenic inheritance and natural selection.** Biol. Rev. 1943 : 18 : 32-64. 575.113.4:575.4

The author expounds the principle of multiple genes and explains certain ways in which their behaviour differs from simple genes. One of these is the manner in which potential variability may be freed by segregation and thus provide the material for selection; with polygenes the process becomes very complicated and very close adjustments are possible, while maintaining the balance between fitness and variability. This potential variability, released by recombination, provides an explanation for the great and prolonged changes that can be brought about in plants and animals under the influence of selection. The rate at which the potential variability is released is controlled not only by the recombination frequency, but by the arrangement of the polygenes in the chromosome. Heterosis is regarded as an expression of lack of balance resulting from selection and hence is seldom to be found in wild populations. The variability produced by mutation is in the case of polygenes mostly potential and is only gradually released to be acted upon by selection. The breeding system is an adaptive character, inbreeding leading to immediate fitness but lack of flexibility, outbreeding to the reverse. The author regards polygenes as the main mechanism even in such operations as heterogeneous breeding systems (pin and thrum, etc.) or sex separation, which are operated by "switch" genes. In this he represents a viewpoint distinct from that of Goldschmidt, who regards the polygenes as secondary and the "switch" mechanism as the fundamental.

379. WADDINGTON, C. H. 575.3:575.1
Canalization of development and the inheritance of acquired characters.
 Nature, Lond. 1942 : 150 : 563-65.

An alternative explanation of the inheritance of acquired characters, involving genetical control is put forward. The thesis is elaborated that "developmental reactions as they occur in organisms submitted to natural selection, are in general canalized". R. M. I.

380. WILLIS, J. C. 576.12:575.24
Evolution in plants by kaleidoscopic mutation.
 Proc. Roy. Soc. Ser. B. 1942 : 131 : 161-69.

The theory is elaborated that evolution proceeds from the family, through genus to species. The endemic type is shown to be the young form and not a refugee and the mutating ancestor must be assumed to possess all the contrasting characters though they are not all shown, hence the analogy with a kaleidoscope. R. M. I.

CYTOLOGY 576.3

381. HARRISON, J. W. H.,
 BLACKBURN, K. B. and
 BOLTON, E. 576.356.5:577.16
Vitamin C and chromosome number in *Rosa*.
 Nature, Lond. 1942 : 150 : p. 574.
 MELVILLE, R. and
 PYKE, M.
Vitamin C and chromosome number in *Rosa*.
 Ibid. 1942 : 150 : p. 574.
 DARLINGTON, C. D.
Vitamin C and chromosome number in *Rosa*.
 Ibid. 1942 : 150 : p. 575.

In the first letter, the writers point out that from their extended investigations, high content of ascorbic acid was associated with early ripening and no correlation could be found with chromosome number.

In the second letter, correlations are found between high ascorbic acid content and a northerly latitude, early ripening, polyploidy and with certain taxonomic groups.

In acknowledging the foregoing letters, Dr. Darlington raises the question as to how vitamin content has come to be associated with increase in chromosome number. R. M. I.

382. BOYES, J. W. 576.356.5:581.04
A new method of plant breeding.
 Pr. Bull. Univ. Alberta 1941 : 26 : p. 5.

Describes the use of colchicine in producing new forms of economic plants, chromosome doubling in tobacco has increased nicotine content 50%, tetraploid tomatoes have more vitamin C than diploids and cotton plants longer and stronger fibres. A more important use of colchicine is the restoration of fertility by chromosome doubling in sterile hybrids between different species and genera. E. K. J.

383. HAWKES, J. G. 576.356.5:581.04
Some effects of the drug colchicine on cell division.
 J. Genet. 1942 : 44 : 11-22.

Colchicine appeared to exert no influence upon resting nuclei or mitotic prophase of cells in *Allium Cepa*. Its action during metaphase to telophase consisted in the inhibition of the spindle mechanism and consequent delay in the division of the centromere.

The relation between the concentrations and length of treatment and recovery to normal was studied.

The subterminal root swellings were found to be due to a lack of polarity in diploid cells behind the root tip and not to an increase in cell volume as supposed by Levan (see "Plant Breeding Abstracts", Vol. VIII. Abst. 1637). E. K. J.

384. THOMAS, P. T. 576.356.5:581.04

The use of drugs in plant improvement.

Gdnrs' Chron. 1942 : 112 : 238-39.

The use of colchicine in the production of polyploidy is briefly described from a theoretical and practical point of view. The value of polyploidy in the production of valuable new types is illustrated by such examples as the Veitchberry, the John Innes Blackberry, the Merton Thornless Blackberry, etc. R. M. I.

BOTANY 58

385. MASON, E. W. 582:578.08

New species and old.

Trans. Brit. Mycol. Soc. 1942 : 25 : 433-34.

"The recently introduced type method of applying names, incorporated into the International Rules, in 1930, sharply differentiates for us the two kinds of synonyms that may be termed the obligate and the facultative".

The author exemplifies these 2 kinds of synonyms and their taxonomic implications, with illustrations of the consequences of false citations in nomenclature.

INTRODUCTION OF NEW SPECIES 631.524

386. McTAGGART, A. 631.524:633(94)

Plant introduction. I. A review, with notes on outstanding species.

Pamphl. Coun. Sci. Industr. Res. Aust. 1942 : No. 114 : 5-14.

Describes thirty plants which are regarded as the most outstanding of the 7,556 species, varieties and strains introduced into Australia since 1930. Fifty-three others which are considered "useful additions" to Australia's plant population are also listed. E. K. J.

PLANT DISEASES AND PESTS 632

387. 632.8:575.242

Making new diseases.

Mon. Sci. News 1942 : No. 16 : 2-3.

A brief popular account of plant viruses and the spontaneous occurrence of new ones, either by mutation or *de novo*.

388. GHOSE, T. P. 632.951.1(54)

A note on *Derris* and other rotenone bearing vegetable insecticides, their occurrence and possibilities of cultivation in India.

For. Leaf. Dehra Dun 1942 : No. 20 : Pp. 9.

A search for rotenone bearing vegetable insecticides in India resulted in the discovery of *Derris ferruginea*, *Millettia pachycarpa* and *Tephrosia candida* as material sufficiently rich for preparation of insecticides. E. K. J.

CEREALS 633.1

389. DILLON WESTON, W. A. R. and TAYLOR, R. E. 633.1-2.421.9

Observations on ergot in cereal crops.

J. Agric. Sci. 1942 : 32 : 457-64.

From examination of records covering 24 years the relative susceptibility of cereal crops to ergot in Great Britain was found to be in the descending order rye, wheat, barley and oats. No definite information has been obtained with regard to the susceptibility of their varieties. The disease was found to be more prevalent in rye of Northern districts. E. K. J.

WHEAT 633.11*

390. BOYES, J. W. 633.11:575(71)
633.16:575(71)

Division of cereal crops.

Pr. Bull. Univ. Alberta 1942 : 27 : 2-3.

Gives an account of the work of the cereal division. The wheat breeding programme consisted of breeding for (1) drought resistant spring wheats, (2) early soft wheats suitable for northern areas, (3) early spring wheat. Crosses for increased seed size, earliness and smut resistance were made with barleys. E. K. J.

* See also Abst. 377.

391. 633.11:575(93.1)
Wheat Research Institute. Eighth Annual Report, May, 1941.
 Bull. Dep. Sci. Industr. Res. N.Z., 1940-41 (1942) : No. 87 : Pp. 24.
 Records the activities of the Institute for 1941. Of particular interest to geneticists is the report on the 1941 harvest, giving information on the milling and baking qualities of new varieties of wheat. E. K. J.
392. 633.11:575.127.5:576.356
PATHAK, G. N.
A preliminary study of the cytology of interspecific hybrids in *Triticum* and an intergeneric hybrid, *T. vulgare* x *Aegilops caudata*.
 Indian J. Genet. Pl. Breed. 1942 : 2 : 37-42.
 Describes the chromosome behaviour of 4 interspecific wheat hybrids and of a cross between *T. vulgare* ($2n = 42$) and *Aegilops caudata* ($2n = 14$) with $2n = 28$ chromosomes. E. K. J.
393. 633.11-2.452-1.521.6:575(71)
NEATBY, K. W.
New varieties of spring wheat resistant to stem rust in the Canadian west, and their genetical background.
 Emp. J. Exp. Agric. 1942 : 10 : 245-52.
 The author summarizes the genetical phases of the breeding work for the production of rust resistant wheats in N. America, giving experimental field data on stem rust reactions, and yield of the rust resistant varieties in comparison to the susceptible variety Marquis. A list of the resistant hybrids and other sources of material for further breeding work is also given. E. K. J.
394. 633.11:664.641.016(71)
ANDERSON, J. A. and
EVA, W. J.
Protein survey of western Canadian wheat 1942 crop.
 Bd Grain Comm. Grain Res. Lab., Winnipeg, Manitoba 1942 : Pp. 32.
 The survey is on the geographical distribution of Western Canadian hard red spring wheat of different protein levels. Table I shows the protein content of each grade for each province and for Western Canada and is illustrated by a map. Table II presents a frequency distribution showing the number of survey samples falling in each grade and within 0.5% protein range. Tables III, IV, V, VI, VII, VIII, IX and X present the data on the 1942 crop in more detail.
- OATS 633.13 ***
395. 633.13-2.112-1.521.6:578.08
ASHBY, E. and
MAY, V.
Physiological studies in drought resistance. I. Technique.
 Proc. Linn. Soc. N.S.W. 1941 : 66 : 107-12.
 A full description is given of the author's technique of determining drought resistance by a method that does not involve the death of the plant, i.e., by measuring the rate at which growth is resumed and continued after a period of drought.
 The experimental data cited refer to an experiment on the effect of nitrogen upon the drought resistance of the Algerian and Fulghum varieties of oats in sand cultures—part of a wider experiment on the effects of mineral fertilizers on drought resistance.
 Apparently there is a significant effect of drought on the recovery rate, depending upon variety and nitrogen level. Drought resistance appears to be an inverse function of the growth rate.
- BARLEY 633.16 †**
396. 633.16:581.46:575:578.08
MEREDITH, W. O. S.,
SALLANS, H. R. and
ROWLAND, H.
Prediction of malt diastatic power of hybrid barleys.
 Sci. Agric. 1942 : 22 : 761-71.
 Determination of activated barley diastatic power of hybrid lines of barley and comparison of the values of those of comparable samples of the parent provided a reliable measure for the selection of those lines that are high in malt diastatic power. E. K. J.

* See also Abst. 377. † See also Absts 377 and 390.

397. SURYANARAYANA MURTY, G. 633.16-2.452-1.521.6:581.45:575.11
Segregation and correlated inheritance of rust-resistance and epidermal characters in a barley cross.
 Indian J. Genet. Pl. Breed. 1942 : 2 : 73-75.

Rust resistance was not correlated with number and length of stomata or number of epidermal cells in F_2 populations of a cross between the highly resistant variety Alpha of *Hordeum distichon* and the susceptible variety Imperial Pusa 21 of *H. vulgare*. E. K. J.

ROOTS AND TUBERS 633.4*

398. 633.4:581.162.3
 633.42:575.127.2

Growing "roots" for seed.

"Growmore" Leaflet No. 85 : Pp. 4.

Describes the pollination habits of the common root crops. In particular swedes are reported to cross with swede-like rapes, rape kale, asparagus kale, ragged jack kale, and hungry gap kale—but not with thousand head kale, marrow stem kale, cabbage and Brussels sprouts. Crossing is possible with turnips. Turnips will cross with turnip-like rapes and Chinese cabbage and possibly swedes. E. K. J.

399. 633.416:576.356.5
 633.426:576.356.5

ARMSTRONG, J. M.

Production and value of polyploid field roots.

Sci. Agric. 1942 : 22 : 787-98.

Tetraploid plants of sugar beet, mangles and swedes obtained by colchicine showed no significant difference in percent of dry matter or sugar content. E. K. J.

400. 633.491-1.524(8)
 633.491:576.312:576.16

HAWKES, J. G.

Cytogenetic studies on South American potatoes.

Abstr. Diss. Univ. Camb. 1940-1941 (1942) : 18-19.

The dissertation consists of six sections, each dealing with a different aspect of the problem of the interrelationship, origin, and evolution of potato species, both in the wild and under the influence of man. The Empire collecting expedition, the photoperiodic reaction, taxonomy, chromosome numbers, geographical distribution and phylogeny of the species are considered.

401. 633.491-2.8-1.521.6:575.114
 633.491:576.356.5

CADMAN, G. H.

Autotetraploid inheritance in the potato: some new evidence.

J. Genet. 1942 : 44 : 33-52.

Data are presented to show that the necrotic reaction to virus X infection in the cultivated potato $2n = 48$ is associated with the dominant allele of a gene designated *nx*.

The segregation of this gene was followed in crosses between common potato varieties and proved to be tetrasomic. Thus it is shown that autotetraploidy offers a sound working hypothesis for further genetical work in the domestic potato. E. K. J.

402. 633.491:581.162.5:575.11
 633.491:575.127.2

PUSHKARNATH.

Studies on sterility in potatoes. 1. The genetics of self- and cross-incompatibilities.

Indian J. Genet. Pl. Breed. 1942 : 2 : 11-36.

Crossing tests with 16 species of wild and cultivated potatoes showed that sterility due to physiological incompatibility was found in the diploids *S. aracc-papa*, *S. Caldasii*, *S. Jamesii* and *S. subtilius* while the triploid *S. Maglia*, 7 tetraploids and one hexaploid *S. demissum* were self-fertile.

Evidence was inconclusive in the case of the pentaploid *S. curtibolum*. Crosses between 17 incompatible varieties of *S. Caldasii* showed 5 intra-sterile and inter-fertile groups. Study of

* See also Abst. 377.

incompatibility relationship between 18 intra-sterile groups showed that some of the groups were genotypically similar.

In all, 8 intra-sterile but inter-fertile groups and plants were established each possessing a different pair of the 5 sterility factors S^1 , S^2 , S^3 , S^4 , and S^5 which operating in various combinations controlled self- and cross-incompatibility.

E. K. J.

FIBRES 633.5

403.

633.51:575(54)

Second conference on cotton growing problems in India. January, 1941.

Rep. Indian Cent. Cott. Comm., Bombay 1941 : Pp. 177.

The report contains many items of interest to plant breeders, chief among which are the following:—

Ramiah, K.

A short review of genetical and plant breeding work in cotton with suggestions for the future. (pp. 8-18).

Amongst the points mentioned as requiring special attention are: (1) further studies in quantitative inheritance in cotton, (2) wider choice of parents for hybridization, (3) breeding for wilt resistance, (4) surveys of the centres of origin of types of indigenous cotton for collection of new types for breeding, and (5) a greater control of the maintenance of purity in the new strains of cotton released.

Ramanatha Ayyar, V.

The need for more intensive programme in hybridisation of cottons in India. (pp. 18-27).

The cotton breeding work in India is reviewed and the need for more hybridization work in breeding programmes suggested.

Amin, K. C.

Interspecific hybridisation and colchicine induced polyploidy in cotton. (pp. 39-42).

Describes the results of doubling of chromosomes by colchicine, of interspecific hybrids of Asiatic cottons ($2n = 26$) and triploid hybridization between Asiatic and American ($2n = 52$). The increase in length of staple was associated with thickening of fibres in the treated plants.

Jacob, K. T.

Preliminary observations on the chromosome morphology in Asiatic cottons with special reference to their phylogeny and inter-relationships. (pp. 42-45).

Of the two pairs of nucleolar chromosomes in *Gossypium Stocksii*, *G. arboreum* (3 varieties) and *G. herbaceum* (3 varieties) one pair was satellited and the other secondarily constricted. The somatic chromosomes could be grouped into 7 types according to their length and morphology.

Dorasami, L. S. and

Hybridisation between two hybrids. (pp. 45-46).

Sreenivasa Ayyangar, G.

Describes crosses between the hybrids (*G. cernuum* x *G. obtusifolium*) and (*G. herbaceum* x *G. arboreum*). A large number of homozygous types of economic importance were selected from F_5 and F_6 progenies of this cross.

Sreenivasa Ayyangar, G.

*Improvement effected by hybridising American (Indian) cottons with a tree cotton, *G. peruvianum*. (pp. 47-48).*

Recent study indicates that there is considerable scope for improving American cottons grown in Mysore by crossing them with *Gossypium peruvianum*.

Patel, G. B.

A review of cotton breeding work in Gujarat. (pp. 48-50).

The varieties originally grown in Gujarat were perennial forms of *Gossypium arboreum*. The present type is chiefly *G. herbaceum* var. *frutescens*.

Russian and Iranian forms of this species are now being used for breeding for improved quality and earliness.

Sethi, B. L. and
Sant, G. K.

American varieties of cotton and their cultivation
in the United Provinces. (pp. 50-54).

It was found that Perso-American races of cotton can be grown with advantage in the United Provinces of India if sown with irrigation in May. These would then replace the low quality cotton *Gossypium arboreum* var. *neglectum*.

Afzal, M.

Present position as regards breeding for jassid
resistance in cotton. (pp. 54-58).

Resistance to jassid in the Punjab was found in Cambodia cotton. An outline of the work in progress for breeding resistant types is given.

Paranjpe, V. N.

Geographical races of *G. arboreum* var. *cernuum*
and *G. arboreum* var. *neglectum* forma *bengalensis*.
(pp. 70-72).

Gives a distribution of the races of indigenous cottons in N.E. India. The region of greatest variability was in the Lushai Hills from where numerous types probably arose. E. K. J.

404.

633.51:575(54)

633.51:575.11

**20th Annual Report of the Indian Central Cotton Committee, for the
year ended 31st August, 1941 : Pp. 174.**

MAHTA, D. N.

The Indian Central Cotton Committee and its work.

Indian Cent. Cott. Comm., Bombay 1941 (1942) : Pp. 32.

Describes, besides other aspects of the work of the Indian Central Cotton Committee, the fundamental research carried on at the Institute of Plant Industry, Indore, on the genetics of cotton. This includes investigation on factors for lintlessness, fuzziness of seed, and anthocyanin, as well as on heterosis and mutations induced by X-rays.

Research schemes initiated in the different provinces and states of India are also described. They deal chiefly with the investigation of local varieties and the production of improved strains. E. K. J.

405.

STEPHENS, S. G.

633.51:576.356.5:575.127.2

Colchicine-produced polyploids in *Gossypium*. I. An autotetraploid Asiatic cotton and certain of its hybrids with wild diploid species.

J. Genet. 1942 : 44 : 272-95.

Meiotic studies of a colchicine produced tetraploid *Gossypium arboreum* var. *neglectum* ($4n = 52$) gave further support to the hypothesis that diploid *Gossypium* species are secondary polyploids. The female gametes of the tetraploid were 40-50% fertile and this was in agreement with the fertility expected from examination of meiosis in pollen mother cells. Male fertility however was lower owing to the slow pollen tube growth of many apparently viable grains.

The tetraploid when crossed with several New World diploid species gave hybrids with less than 1 trivalent per pollen cell thus indicating that homologies between Asiatic and wild diploid species are very low.

The use of induced polyploidy in cotton breeding is shown to be restricted, owing to the secondary polyploidy which exists in all species of *Gossypium*. J. G. H.

406.

NATH, B.

633.51:581.46:575.11.061.6

Genetics of petal colour in Asiatic cottons.

Indian J. Genet. Pl. Breed. 1942 : 2 : 43-49.

"It is shown that 2 factors, Y_a and Y_b , are necessary for the production of yellow petal in Asiatic cottons. Y_b is shown to assort independently of the gene R_2 ". Author's summary.

SUGAR PLANTS 633.6

407.

Sugar—food for man and gun.

S. Afr. Sug. J. 1942 : 26 : 391-95.

633.61:575

The article traces the history of sugar from the migration of sugar cane from India to the west with Alexander's invasion, to the modern chapter in its history as the principal ingredient of smokeless powder in nitrocellulose. E. K. J.

408. VENKATRAMAN, T. S. 633.61:575(54)

The message of the sugarcane.

Indian J. Genet. Pl. Breed. 1942 : 2 : 3-10.

Features characteristic of sugar cane distinguishing its breeding from most other crops are:— (1) Its vegetative method of propagation, (2) the wide variation found in its selfed seedlings owing to the complexity of its genetic structures, (3) the possibility of hybridization with widely separated genera, (4) the fertility of some of its intergeneric and interspecific hybrids. The Indian sugar cane industry also possesses certain distinguishing features as such. The industry itself and certain of the canes grown until recently have been in existence from very ancient times. For lasting results the cane breeder had to make use of this basic Indian experience and the favourable points in the life cycle of indigenous types had to be bred with the new varieties.

Java was the first country to benefit from the employment of an indigenous Indian cane, while India herself was the first deliberately to use a wild species of *Saccharum* in the evolution of new improved types. The success of this venture led her to even more unorthodox trials which have revolutionized cane breeding. Continuous and bold hybridizations, studies of large populations, an intimate knowledge of the crop in the field and early tests in cultivators' fields are advocated for all Indian crops.

E. K. J.

409. D., H. H. 633.61:575(68)

Experiment Station notes. Important fertilizer experiments.

S. Afr. Sug. J. 1942 : 26 : 365-69.

The Experiment Station notes give results of breeding and performance of new seedlings.

E. K. J.

410. STEVENSON, G. C. 633.61:575(69.82)

L'adaptation des nouvelles variétés de cannes aux différentes localités de Maurice. (**The adaptation of new varieties of canes to the different localities of Mauritius**).

Rev. Agric. Maurice 1941 : 20 : 3-6.

The results are given of trials of three new varieties of sugar-cane, M. 171/30, M. 72/31 and M. 134/32. M. 171/30 is derived from R.P. 6 and M. 27/16 and has no wild ancestry. Suitable only for areas of medium and high rainfall, it yields well under the right conditions and the quality of the sap is satisfactory where the rainfall is high. M. 72/31 is a product of P.O.J. 2878 and of the "noble" cane, M. 35/17, and also contains a slight proportion of wild ancestry. It does well in cool regions with a high rainfall and is distinguished by the high quality of the sap. M. 134/32 also contains a certain proportion of wild ancestry inherited from P.O.J. 2878. It germinates well, has a healthy appearance and good yield and seems resistant to cyclones. It appears to do best in the dry coastal regions, especially in the north, and on less fertile soils.

R. M. I.

411. STEVENSON, G. C. 633.61:575(69.82)

Obtention et sélection de nouvelles variétés de cannes. (**Production and selection of new varieties of sugar cane**).

Rev. Agric. Maurice 1941 : 20 : 135-39.

A popular account of the methods and objects of sugar cane breeding carried out by the sugar cane Research Station of Mauritius.

R. M. I.

412. 633.61:575(72.9)

633.61:575.127.2

Eighth Annual Report of the British West Indies Central Sugar Cane Breeding Station, Barbados, ending September 30th, 1941 : Pp. 37.

Breeding work is now exclusively directed to the "nobilization" or production of hybrids between the "noble" or thick cane and wild forms of *Saccharum* or their derivatives. For this purpose new breeding material was obtained from the U.S.A. Department of Agriculture and comprises wild sugar canes hitherto not used by the station.

E. K. J.

413. WILLIAMS, C. H. B. and CAMERON, C.

Field experiments with sugar cane, XI.

Sug. Bull. Dep. Agric. Brit. Guiana 1942 : No. 11 : 1-37.

633.61:575(88)

Field experiments with sugar cane conducted in British Guiana showed that P.O.J. 2878 is the

variety best suited to the country as regards yield; hardiness and rationing. Four local hybrids D 14/33, D 419/33, D 14/34, D 166/34, as well as Co. 419 and Co. 421, however, justify extension of planting. E. K. J.

414. 633.61:575(94.3)

Notes on new cane varieties in south Queensland.

Aust. Sug. J. 1942 : 34 : p. 215.

Gives the pedigrees, general characteristics and field performance of the new canes, Q. 25, Q. 28, Q. 42, Q. 44, C.P. 29/116 and Atlas for the benefit of farmers. E. K. J.

415. STEVENSON, M. G. C. 633.61:575.12:581.143:575.3(68)

The effect of different localities on the growth of sugarcane varieties.

S. Afr. Sug. J. 1942 : 26 : 433-37.

States the importance of the study of vegetative growth cycles of new "hybrid" canes in regions where they are replacing varieties of *Saccharum officinarum*. E. K. J.

416. JANAKI-AMMAL, E. K. 633.61:575.127.5

Intergeneric hybrids of *Saccharum*. IV. *Saccharum-Narenga*.

J. Genet. 1942 : 44 : 23-32.

The hybrids made by the late C. A. Barber in 1913 between *Saccharum officinarum* ($2n = 80$) and *Narenga porphyrocoma* ($2n = 30$) have $2n = 55$ chromosomes and are completely sterile. They show detailed qualitative characters of each parent and are in general intermediate for quantitative characters.

The chromosomes of the hybrids show autosynopsis. Univalents which are probably derived from *Narenga* divide at I or II metaphase and form micronuclei. Pollen sterility of the hybrids is over 90%.

417. BECHARD, R. M. 633.61:581.6

Juice retention value of varieties of cane. As handled at Amatikulu during seasons 1940 and 1941.

Proc. 16th Congr. S. Afr. Sug. Tech. Ass. 1942 : 40-42.

The juice holding capacity of sugar cane was found to vary with the varieties used. Co. 290 retained 24-25 % more juice for each unit of fibre than Co. 281. E. K. J.

418. DYMOND, G. C. 633.61:581.6

Varietal milling results in Natal, 1941.

Proc. 16th Congr. S. Afr. Sug. Tech. Ass. 1942 : 37-40.

The quality of fibre was found to be a significant factor in the milling of sugar canes. Regional effects were noticed in some varieties. E. K. J.

419. 633.61-1.557(72.9)

The yield of sugar cane in Barbados in 1941.

Bull. B.W.I. Cent. Sug. Cane Breed. Sta. 1942 : No. 24 : Pp. 10.

"The yield per arable acre of the whole plantation is the measure which determines whether sugar cane is being produced on an economic basis". This bulletin is a survey for Barbados. E. K. J.

420. WIEHE, M. P. O. 633.61-2.483-1.521.6(69.82)

La morve rouge de la canne à sucre. (Red rot of sugar-cane).

Rev. Agric. Maurice 1941 : 20 : 198-202.

In this lecture the periods of growth of the sugar-cane which coincide with attacks by *Colletotrichum falcatum* are discussed, with the conclusion that even slightly susceptible varieties should not be planted as main season canes. R. M. I.

421. EVANS, H. 633.61-2.7-1.521.6:575(69.82)

Recherches sur la résistance aux *Phytophthora*. (Research on the resistance to *Phytophthora*).

Rev. Agric. Maurice 1940 : 19 : 49-51.

This résumé of the work of the botanical section in the annual report for 1939 of the sugar cane

Research Station deals with an experiment on resistance to *Phytlus* undertaken in collaboration with the genetics and entomology sections. From the physiological point of view, the resistance is based on the fact that there exists a close correlation between yields and the power of replacement of the roots destroyed by *Phytlus* or any other cause. The new varieties produced by the Research Station are far superior to the commercial varieties in yield and resistance to *Phytlus*. R. M. I.

STIMULANTS 633.7

422. THOMAS, A. S. 633.73-1.524:582(62.4)
The wild *Arabica* coffee on the Boma plateau, Anglo-Egyptian Sudan.
 Emp. J. Exp. Agric. 1942 : 10 : 207-12.

Describes the characters of wild *Coffea arabica*, growing on the Boma plateau in S.E. Anglo-Egyptian Sudan. E. K. J.

OIL PLANTS 633.85

423. KADAM, B. S. and PATANKAR, V. K. 633.854.797:581.162.32
Natural cross-pollination in safflower. 633.854.797:575.11.061.6
 Indian J. Genet. Pl. Breed. 1942 : 2 : 69-70.

The orange petal colour in safflower (*Carthamus tinctorius*) was found to be dominant to the white. The extent of cross-pollination was measured by studies on the extent of vicinism on these varieties. E. K. J.

FRUITS 634

424. FIELD, C. P. 634.11-2.111-1.521.6
Low temperature injury to fruit blossom. II. A comparison of the relative susceptibility and effect of environmental factors on three commercial apple varieties.
 29th Rep. E. Malling Res. Sta. 1941 (1942): 29-35.

Three commercial apples, Cox's orange pippin, Bramley's Seedling and Worcester Pearmain showed marked difference in susceptibility of their fruit blossoms to frost damage. E. K. J.

425. CRANE, M. B. and BROWN, A. G. 634.22:581.162.3:575.183
The causal sequence of fruit development.
 J. Genet. 1942 : 44 : 160-68.

All cases of so-called xenia in which maternal tissue is affected are shown to be due to the difference in the constitution and development of the embryos.

In plums, as in other fruits, defective embryos promote earlier ripening and smaller fruits.

The wider the difference between the parents the more defective were the embryos. E. K. J.

426. INGRAM, C. 634.23:575.127.2
Cherry hybrids.
 'Gdnrs' Chron. 1942 : 112 : p. 163.

Crosses, both natural and artificial, between varieties of ornamental cherries are briefly noted. R. M. I.

427. HALL, W. J. 634.3:575(68.9)
A decade of citrus research in Southern Rhodesia.
 Proc. Trans. Rhodesia Sci. Ass. 1941 : 38 : 74-87.

The work in progress includes studies on bud selection. Increased yields can only be obtained by improving the types of tree grown and this, it is claimed, can only be attained by intensive research.

428. KADAM, B. S. 634.651:577.8:575.11
The newer knowledge of sex inheritance in the papaya.
 Indian J. Genet. Pl. Breed. 1942 : 2 : 66-68.

Summarizes the genetical work of Hofmeyr (see "Plant Breeding Abstracts", Vol. IX, Abst. 85) and Storey (see "Plant Breeding Abstracts", Vol. VIII, Abst. 1619) on sex determination in *Carica papaya*. E. K. J.

429. BOSMAN, F. H. 634.775.4:575.061.5
Spineless cactus.
 Fmg. S. Afr. 1942 : 17 : 665-67.

Describes the variability in yield, palatability and spicule production of the spineless cactus recommended as a fodder plant in South Africa.

Of the 27 forms tested the two selected for planting were "Skinner's Court" and "Sicilian Indian Fig". E. K. J.

FORESTRY 634.9

430. LAURIE, M. V. and GRIFFITH, A. L. 634.973:575.11
The problem of the pure teak plantation.
 Indian For. Rec. (N.S.) Silviculture 1941 : 5 : 13-121.

The following characters in teak which are defects are considered as probably inherited from parent seed trees: (1) branching habit, (2) production of epicormic branches, (3) texture of leaf and (4) timber quality, size of vessels and pattern. It is probable that insect resistance is correlated with leaf texture. E. K. J.

431. LOOBY, W. J. and DOYLE, J. 634.975:582:581.33
Formation of gynospore, female gametophyte, and archegonia in *Sequoia*.

Sci. Proc. R. Dublin Soc. (N.S.) 1942 : 23 : 35-54.

Comparative studies on the female gametophyte and archegonia of the Sierra Redwood tree *Sequoia gigantea* and the Coast Redwood (*Sequoia sempervirens*) support the removal of the former from the genus *Sequoia*. *Sequoia gigantea* thus becomes *Wellingtonia gigantea*. E. K. J.

VEGETABLES 635

432. MAHER, F. A. 635:575.3(94.5)
Vegetable planting guide for Victoria.
 J. Dep. Agric. Vict. 1942 : 40 : 424-30.

A planting table for vegetable crops in Victoria gives a list of varieties of vegetables best suited for the region. E. K. J.

433. HOWARD, H. W. 635.34:576.356.5:577.17
Heteroauxin and the production of tetraploid shoots by the callus method in *Brassica oleracea*.
 J. Genet. 1942 : 44 : 1-9.

In *Brassica oleracea* the frequency of tetraploid callus shoots obtained by decapitation was about 1%. Treatment with heteroauxin did not change this frequency. The origin of new meristems from vacuolated cells in calluses is described. It is suggested that tetraploid areas in calluses are caused by the division of vacuolated cells which contain nuclei with diplochromosomes. E. K. J.

434. BODDY, F. A. 635.64-2.484-1.521.6:575
Varietal resistance to tomato disease.
 Gdnrs' Chron. 1942 : 112 : p. 219.

A cross between the American variety Marglobe Wilt-resistant and Clibran's Victory gave an F₁ among which were plants with a high degree of resistance to *Cladosporium* and without the undesirable characters of Marglobe. Further breeding will show if the resistance is maintained in later generations but possibilities for further improvement are indicated by this method. R. M. I.

435. FAULKNER, R. P.* 635.64-2.484-1.521.6:575
Tomato Vetomold.
 Gdnrs' Chron. 1942 : 112 : p. 184.

An account of satisfactory trials of this new variety raised from a cross between the Red Currant tomato and the Cheshunt strain of Potentate and resistant to *Cladosporium fulvum* (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 70). R. M. I.

436. SINGH, H. B. 635.646:576.356.5:575.242

A naturally-occurring tetraploid brinjal.

Indian J. Genet. Pl. Breed. 1942 : 2 : 71-72.

A spontaneous tetraploid ($2n = 48$) was found in a culture of brinjal (*Solanum Melongena*) var. Muktakeshi ($2n = 24$). The mutant had 50-60% good pollen and fruit formation was poor.

E. K. J.

437. 635.657:581.45:575.242

EKBOTE, R. B.

635.657:576.312.35

Genetics of two mutations in *Cicer*.

Indian J. Genet. Pl. Breed. 1942 : 2 : 50-65.

Two mutants of *Cicer arietinum* "Tinvleaved" and "Simple leaved" had the same chromosome number $2n = 16$ as the normal. "Tinv leaved" behaves as recessive to normal and is conditioned by a single pair of genes t_{iv} t_{iv} .

The mutation "simple leaf" was also recessive to normal; F_2 segregation gave approximately 1 : 3 ratios but F_3 and F_4 showed that the mutant character was unstable and capable of reversion to normal.

Two other cases of gene mutation affecting flower colour and seed coat colour are recorded.

E. K. J.

Part II. Foreign.

BREEDING 575

438. LAMPRECHT, H. 575:48.5
Växtförädlingsarbetet på Weibullsholm. Dess omfattning och metoder.
(Plant breeding at Weibullsholm. Its extent and methods).
Weibulls III. Årsb. 1942 : 37 : 9-12.

A brief outline of the methods of plant breeding employed at Weibullsholm and a list of the chief personnel. R. M. I.

439. 575:633(46.9)

Guia dos ensaios de campo. (Guide to the field tests).
Estac. Melhor. Plantas, Elvas 1942 : Pp. 20.

The plant breeding station at Elvas (Estação de Melhoramento de Plantas) is engaged in breeding varieties of wheat that are superior in earliness, strength of straw, density of ear, disease resistance and quality; barley of better malting quality on the one hand and feeding barleys with higher protein content on the other; oats with heavier grain, higher nutritive power and greater disease resistance; rye with better baking quality and yield; maize with increased number of cobs per plant, quality and disease resistance; and improved forms of meadow and pasture plants. The present small brochure serves as a guide to the lay-out of the experimental plots on which the various tests are carried out, and gives a list of the species with which work is in progress.

440. *ÅKERMAN, Å. 575:633(48.5)
Årsberättelse över Sveriges Utsädesförenings verksamhet under år 1939.
(Annual report on the work of the Swedish Seed Association during the year 1939).
Sverig. Utsädesfören. Tidskr. 1940 : 50 : 153-207.

The work of the Association was considerably extended during 1939 and as well as the usual crops, also flax, hemp, rape, maize, soya beans and sweet lupins, which are new crops, are undergoing improvement. Research on other crops has resulted in the production of new varieties such as the wheats, Skandia II and Glutenvete (from the Ultuna Station); the rye Kungsråg, the oat Solhavre, Hero white clover and the Nova fodder sugar beet. Among the new varieties and elite selections specially mentioned are:—

The autumn wheats: K 01280 derived from the cross Solvete x Standard at the Kalmar Branch—it yields more than Standard II and has a higher hectolitre weight than either parent; Ög 01144b, a line obtained from Gyllenvete II which it surpasses in winterhardiness; U 01250, a new variety produced at Ultuna from the cross Sol II x Svea II—it matures much earlier and has much stronger straw and a glabrous ear; Winter barley 39 6 from the cross Mansholts x Rumanian—high yielding and winterhardy; Barley No. 33 24 obtained from Seger, Victory x Opal, short and very stiff strawed, dense eared, early and superior to Kenia in yield and starch content; No. 01025 C, a new line of spring wheat from Diamant II with somewhat higher yield of grain and stronger straw; Strains 01431 c, L 01341, Vg 01534 and 01539 b are promising new oats obtained by hybridization; the sugar beet strain 033 is a new variety obtained by selection out of strain 015 and giving a high yield of roots and sugar and showing little tendency to bolt.

The work with cereals followed the same general lines as in previous years. Full details are given of the trials at Svalöf and other centres. The Canadian variety of maize Manalta gave the highest yield in combination with earliness—6,030 kg. per ha. ripening on 15th August at Öland. In yield alone, however, it was surpassed by the German Mahndorfer with 7,200 kg. per ha.

Extensive sowings have been made of hybrids between various X-ray mutations in ordinary 2 rowed barley induced in order to study their inheritance and their possible practical value. The mutants, some of which have extremely stiff straw, are now to be investigated in crosses with other varieties of high economic merit.

Crosses have been made with different varieties of bitter lupin.

In spite of serious bacterial disease the Gul Svensk swede and crosses of it by Bangholm did moderately well and some plants set seed. As in previous years bolting trials of a number of strains and selected lines of sugar and fodder beet were laid out. A small experiment with F₁

* An extended summary of this paper is on file at the Bureau.

progeny from crosses between different lines and strains of both sugar and fodder beets and swedes was begun. F₁ progeny from crosses between selected lines of turnips highly resistant to *Plasmodiophora Brassicae* give evidence of a certain degree of resistance when grown in infected soil.

Hybridization and selection of fibre flaxes proceeded on a large scale at Svalöf as well as Ljungbyhed and Riseberga. The highest yield 4,420 kg. of fibre per ha. was however produced by a line selected from Svalöfs white flowered flax; while Concurrent and Sorauer Lusatia led in seed production with about 1350 kg. per ha.

Several promising new lines were identified in the preliminary experiments in progress.

The Ög lines of linseed again showed merit, the best yielding 2,270 kg. seed per ha., while the control variety, ordinary commercial seed from La Plata, averaged 2,120 kg. per ha. Selection tends to show that the Argentine oil flaxes available for breeding are considerably more promising than the Indian or North American.

In hemp research in addition to the collecting of varieties, isolation of types and selection of initial plant material, two comparative trials were laid down. Results showed that seed production must be confined to southern regions of Sweden.

Trials of 23 varieties of poppies from various European countries showed good yields and an oil content of from 40–45%.

Selection of hops is now being carried out in conjunction with quality tests. Hormone treatment of cuttings has given very promising results.

Work on peas (including fodder peas) has resulted in some good new lines whose release is being considered. Quality is receiving special attention. Resistance to damage by *Laspeyresia* larvae was also studied.

Differences between yields of vetch grown in mixtures and alone must be taken into account with reference to the technique of vetch trials.

Some new lines of field beans have been obtained with a good yield combined with a lower 1,000 seed weight than that of the original populations from which the selections were derived. In soya bean improvement, in addition to high yield, earliness and high oil and protein content, tall stems are a further desirable aim in breeding to facilitate machine harvesting without loss of pods and seed. The method used consists in selection in Manchurian land varieties together with crossing between different early and high yielding improved varieties. Greenhouse facilities made it possible to obtain a much larger number of hybrids than in 1938.

Experiments to increase the mutation frequency by X-ray irradiation of the seed were made and work on colchicine treatment of seed to obtain plants with increased chromosome number was also conducted—both lines of enquiry being in the preliminary stage.

Variety trials showed better yields and also higher fat content (for some varieties over 20%), but the protein content was low.

The Chromosome Division no longer deals with wheat, rye and barley, but its work has been extended to include fodder and sugar beets, red clover, white clover, flax and soya beans, while its research on timothy, cocksfoot and potatoes is being continued. It is also responsible for the cytological side of the production and improvement of tetraploid sugar beets.

In most of the above named crop plants sectors with chromosome reduplication have been obtained, and complete tetraploids of beet and of flax and linseed. Tetraploid potatoes have been obtained by combining the colchicine and Jørgensen techniques.

Numerous progeny from 63 chromosome twin plants of timothy have been handed over to the herbage plant section, as well as some valuable cocksfoot types produced by the Chromosome Division. About 50 chemical substances supposed to have a similar action to that of colchicine were tested.

Work on rye-wheat and on barley and rye with reduplicated chromosome number is proceeding on the same lines as before, though some of the series of experiments have been transferred to the Genetics Institute.

The oldest material consists of F₄ plants from Triticale Taylor x Triticale Rimpau. Research on tetraploid barleys has also been extended by raising F₃ families after crossing between entirely dissimilar tetraploid varieties. From selection among such progenies an increase in yield may be expected.

The variety trials and other crop improvement work of the Ultuna, Kalmar, Östergötland, Värmland, Västergötland, Västernorrland, Jämtland and Upper Norrland branches of the Association are discussed in full detail.

441. *ÅKERMAN, Å. 575:633(48.5)
 Årsberättelse över Sveriges Utsädesförenings verksamhet under år 1940.
 (Annual report on the work of the Swedish Seed Association during
 the year 1940).

Sverig. Utsädesfören. Tidskr. 1941 : 51 : 125-73.

In spite of difficult economic conditions and the severe winter drought of 1940 the Swedish Seed Association and its various local branches managed to maintain their research activities and even in some respects to extend them to embrace new crops.

Among the new varieties and strains now ready for multiplication are:

The winter wheats 0987 e (Stålvete II)—derived from Stål and combining its stiffness of straw and grain quality with superior winterhardiness and yield of grain; 01091 (Skandiavete III)—a new variety from an older selection of Skandia and combining the good qualities of Skandia II with better winter hardiness; 01321 b (from Standard x Carsten V); the winter barley 39/16 a variety from Mansholt x Pomm. Nordland; autumn ryes 0302 and 0302 i—new selections from Stålråg and Kungsråg (out of Svalöfs Stålråg) respectively; Vg 01481 an oat hybrid (Stjärn x Guldregn) intended to compete with Guldregn II; the new Malmårt fodder pea 01020, small seeded type of the Rättviksärt but with a higher yield; the new fodder pea Å 02001 which closely approaches the Bottnia pea.

For spring wheat the aim is to increase yields, while for winter wheat quality and stiffness of straw are the objectives. Selection of old land wheats is also in progress to obtain frost resistant forms of high baking quality.

In oat breeding a white oat is wanted for Southern Sweden with high yield, strong straw and good quality of grain. A new variety of the Orion type, No. 01331, has been produced for Norrland and is competing successfully with Orion II.

The drought resistance of the Central Swedish black oat was confirmed: and *Avena strigosa* showed no injury whatever in spite of the severe drought.

In work on rye some breeding material was obtained by selection from Petkus spring rye and a land rye from Od. With autumn rye the same programme as in previous years was followed. At Ljungbyhed good results were obtained with maize, a crop which appeared to suffer less than most plants from the summer drought.

High yields combined with outstanding malting quality was obtained in barley crosses between Maja and lines from Seger x Opal (32/27, 33/24 and 34/22), while yields higher than Kenia with the same desirable stiffness of straw were obtained from a number of new fodder barleys from crosses between Swedish land barleys (with high protein content) and Kenia and Maja.

New six-rowed lines from the Brio x Kenia cross gave the highest yield combined with the earliness of the six-rowed type.

The results of laboratory freezing tests were confirmed in trials of barley types under very severe winter conditions.

Line selection in an old land variety of the bitter blue lupin gave a great variety of types, some earlier than the sweet lupin. Though blue lupin crosses were a failure, many F_1 and F_2 from former crosses provided material for mass selection for freedom from the bitter principle and for earliness.

Experiments with X-ray irradiation of yellow lupin seed were begun in 1940.

The potato research programme was continued and for the first time investigations have been begun on vitamin C content. The 1940 seedling material was especially successful; selection was begun and also some new crosses were made.

Though much of the South American material has been lost by virus diseases, its study is being continued and the progeny of crosses and back-crosses is now being included in weighing tests.

Quality investigations of table potatoes of old and new clones and about 1,000 analyses of vitamin C content were made. The results will be published in 1941. The technique of starch determination was also studied.

Some new lines of flax gave good yields and trials and investigations on technique were again carried out.

Among the Ög lines of linseed Ög 35/147 was specially promising.

Hemp experiments were affected by the drought and some of the Southern European varieties set no seed. Schurigs hemp matured satisfactorily.

* An extended summary of this paper is on file at the Bureau.

Preliminary work on tobacco breeding was begun and a survey was made of Swedish varieties. Many crosses have been made between different Swedish varieties and between Swedish and foreign types. The aims are:

Snuff tobacco (for which Swedish varieties are primarily used) is required that can be relied on to give a good crop and is high yielding and of superior quality. The foreign tobaccos are being tried mainly as cigarette or pipe tobacco, but some of the Swedish varieties are also to be used for these purposes and hybridization is being carried out to combine the quality of the foreign types with the better cultural features of the Swedish forms. The primary object is to obtain qualities which can be mixed with foreign leaf to produce ordinary cheap brands for the pipe and cigarette smoker.

Nicotine production will also be ultimately included among the problems to be studied.

Using the material from various European countries poppy improvement was continued. Great varietal differences were recorded in drought resistance.

At Svalöf the highest yielding variety gave 1,270 kg. per ha. The oil content was about 45% of the dry matter.

Selection and hybridization were carried out to obtain a type that shall be early and high yielding as well as having all capsules completely closed at maturity.

Some promising hop clones were selected on the basis of their performance for some years. A new generation of hybrids has been planted at Svalöf and at Näsund and Dr Nilsson-Leissner undertook for the Association for Swedish Hop Growing a tour to Västernorrland, Gotland and Södermanland and studied some old hop strains from which cuttings were collected for trials at Svalöf.

Crosses of winter rape were made and also selections of white mustard and spring rape.

An oil content of about 27% was recorded in trials of some 20 varieties of sunflowers.

Smaller observation plots were laid out with *Carthamus tinctorius*, *Ricinus* and *Cyperus aesculentus*.

At Svalöf work was conducted on peas, vetches and beans.

One Bulgarian strain of vetch yielded well in spite of the drought.

The Stella bean again held its place in the brown-seeded bean trials.

At Ultuna two new early pea varieties with improved yield and cooking quality receive special mention; as well as a new high yielding fodder pea 01080 (from Torsdags II x Solo) and a fodder pea 01020 (derived from the Rättviks pea) which was released in 1941 under the name Malmärt.

In addition to the internal quality of peas, their cooking quality was studied, a standard technique for the purpose having been elaborated.

The soya bean programme was continued. Much work was done with X-ray irradiation of seed to increase the mutation frequency and with colchicine to raise the chromosome number. Material thus treated in the previous year underwent selection and some aberrant types were isolated for further research.

In variety trials in various localities ripening was in many cases delayed and yields low. The oil content was about 14% of the dry matter and the protein about 43%.

The Chromosome Division has obtained by colchicine treatment tetraploid types of fodder and sugar beet, red clover, potatoes, fibre flax, linseed and soya bean which are being grown with the original diploid forms to compare the morphological changes and the reactions resulting from chromosome doubling. It has been observed that different varieties of the same crop may react quite differently, e.g. tetraploid fibre flax varieties were smaller than the diploids, whereas tetraploid linseed varieties were taller. The tetraploids all showed low fertility of the seed, while the vegetative parts, at least in certain species, are more vigorous. Enough seed has now been obtained from tetraploid flaxes, red clover and beets to provide for more reliable comparative trials than hitherto.

New tetraploid material has also been produced by the same method applied to white clover, alsike clover and blue lucerne and new 63-chromosome timothy has been obtained by the twin plant method.

The reaction of various crops to other chemical substances has been investigated.

The work of the Institute for Genetic Research (in collaboration with Lund University) was continued with the cereals transferred the previous year from the Chromosome Department.

The tetraploid barleys included: (1) a collection of true breeding varieties undergoing investigation for their chemical properties, fertility and yield; (2) a larger F_4 generation from hybridizations

between different tetraploid varieties; and (3) a series of experiments on rye (diploid and tetraploid), the object being to elucidate the causes of degeneration due to inbreeding. In the various crop trials and other work conducted by the affiliated institutions and centres collaborating with the Association the following points may be of particular interest:— Several new barleys from *erectum* types (out of *erectum* x *nutans* hybrids) and from *hexastichum* types (out of *erectum* x *hexastichum* hybrids) seem promising as possible substitutes for Primus II.

Among the fodder peas tested at the Västernorrland station a couple of lines from the Skedom land variety attracted most interest. They are early, mature rapidly and give high yields.

442.

575:633(86)

Informes sobre las labores desarrolladas en los diferentes departamentos tecnicos de la Estacion Agricola Experimental de Palmira. (**Reports on the work carried out in the different technical departments of the Palmira Agricultural Experiment Station**).

Agricultura Ganad., Bogotá 1941 : 13 : 989-1095.

Rice

Tests of a number of varieties have shown Lady Wright to be the best.

Sugar Cane

The local cane (Criolla) has since 1934 been severely infected with mosaic, the Java canes are somewhat unsuitable for small-scale cultivation and crosses have therefore been made between various noble canes and *Saccharum spontaneum* from Turkestan. This cane has an astonishing tillering capacity and is resistant to frost and almost all diseases. The methods used in crossing and selection of the seedlings are described; from the first 6,500 seedlings 51 were selected and the second generation (back-cross) contains some very promising seedlings. Crosses have also been made between the local cane and P.O.J. 2878 and other noble canes.

443.

PIRES, D. R. V.

575:633:581.1

O melhoramento de plantas e a fisiologia. (**Plant breeding and physiology**).

Rev. Agron., Lisboa 1942 : 30 : 64-69.

This is the full presentation of the article referred to in "Plant Breeding Abstracts", Vol. XII, Abst. 969.

GENETICS 575.1

444.

575.1:578.08

YAMAZAKI, M.

576.312

(**Theories of breeding and their applications**).

Bot. and Zool. 1938 : 6 : 206-12.

The writer formulates his views on plant breeding and genetics under various heads, including the technique of propagation (regulation and acceleration of flowering), pollen storage, sterility, interspecific hybridization, induced mutation, parthenogenesis, resistance to disease, drought and cold, techniques (including micro-cultures in the study of ecological characteristics) and chromosome numbers as a means of identification of varieties.

445.

RICHEY, F. D.

575.125

Mock-dominance and hybrid vigor.

Science 1942 : 96 : 280-81.

An analysis is made of "mock-dominance", that is of hybrid vigour in cases where dominance is lacking. The explanation is not intended to apply to those cases accounted for by the interaction of dominant genes but rather to the smaller increases in vigour frequently reported in breeding experiments.

R. M. I.

446.

ZIMMER, K. G. and

TIMOFÉEFF-RESSOVSKY, N. W.

575.24:537.531

Über einige physikalische Vorgänge bei der Auslösung von Genmutationen durch Strahlung. (**Certain physical processes and the production of gene mutations by irradiation**).

Z. indukt. Abstamm. -u. VererbLehre 1942 : 80 : 353-72.

The use of very dense ionizations produced by neutrons led to a reduction in the mutation rate, once more suggesting the existence of a sphere of action (Trefferbereich) of finite dimensions,

within which a second hit produces no further effect. The size of this sphere of action has been calculated theoretically as of the order of magnitude of 1,000 atoms, which agrees well with that found in practice, assuming that a single mutation is produced by a single ionization and not by a group of ions. The results can be interpreted satisfactorily without assuming the transference of energy indirectly by activated molecules and the authors find no reason to alter their earlier views on the mutation process.

ORIGIN OF SPECIES 576.1

447. TURRILL, W. B.

576.1:582

Taxonomy and phylogeny.

Bot. Rev. 1942 : 8 : 473-532, 655-707.

Part II of this critical survey (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 99) deals very fully with two main aspects of the problem of the relation between taxonomy and phylogeny namely: (1) taxonomic and phylogenetic concepts and criteria and (2) data used in classification and phylogenetic studies—the latter section includes special sub-sections dealing with the cytological and the genetical contributions.

In discussing the value of ecological and phytogeographical data, the author expresses the view that "though phytogeography has much light to throw on phylogeny and much help to give taxonomy" . . . "full and careful analysis is essential before synthesis."

Part III deals with classification and phylogeny in major plant groups; logical as opposed to phylogenetic classification; phylogenetic diagrams and the summing up.

In the final discussion of this comprehensive and suggestive review the writer pleads for the use of more inductive methods in phylogenetic investigation (especially in the angiosperms). He also considers the main question of how far a known phylogeny can be incorporated in an improved classification and further points out the limitation that should be imposed in the use of phylogeny in a general classification.

In conclusion the increasing difficulty of fitting the results of modern studies in autecology and genetics into the existing scheme of taxonomic nomenclature is indicated and this fact and its relevance to phylogenetic research too is recommended to the urgent attention of biologists.

448. GREGOR, J. W.

576.16:582

The units of experimental taxonomy.

Chronica Botanica 1942 : 7 : 193-96.

In experimental taxonomy or population taxonomy (in contrast to traditional taxonomy) the emphasis is transferred from the attributes of the organism to the processes which separate populations in nature. Experimental taxonomy is at present passing through its formative stages and its nomenclature needs unification to eliminate the prevailing diversity of interpretations of some of the terms used. The present paper discusses and defines numerous infra-specific and specific units such as the ecotype and the ecospecies, drawing special attention to the proper use of the former term.

The peculiar problems presented by the asexually reproducing organisms and the facultative apomicts are also mentioned; and the need for an intensive methodical collection and judicious choice of suitable living material is stressed as a pre-requisite, if the data incorporated in an experimental taxonomic system are to elucidate the processes underlying population differentiation.

CYTOLOGY 576.3

449. LÖVE, A. and

576.312.35:633(48)

LÖVE, D.

Chromosome numbers of Scandinavian plant species.

Bot. Notiser 1942 : 19-59.

In this list the diploid ($2n$) number is given for the species, and the basic number (x) is indicated for most genera. Only the species of flowering plants native or naturalized in the four Scandinavian countries have been included, and the large apomictic genera such as *Taraxacum* and *Hieraceum* are excluded. The authors acknowledge that even if the chromosome number in most of the cases may be a help in solving the problems, it must not be regarded as the main criterion of a species; nevertheless it is thought desirable that taxonomists should make it a rule to perform cytogenetic investigations on the material studied, before the taxonomic value of the types is established.

An examination of the chromosome numbers of the Scandinavian plants shows that the percentage of polyploid species is highest in Finland and lowest in Denmark, though the difference is not statistically significant.

450.

CORNMAN, I.

576.353:581.04

581.16:581.04:632.3

Susceptibility of *Colchicum* and *Chlamydomonas* to colchicine.

Bot. Gaz. 1942 : 104 : 50-62.

Experiments were made on the effects of colchicine on mitosis in *Colchicum* species and of colchicine and also acenaphthene upon the reproduction rate in *Chlamydomonas pseudococcus*. It is concluded (1) that the immunity found in excised roots of *Colchicum* results from an extra-mitotic protection and not from a difference in the mitotic mechanism; (2) that *C. pseudococcus*, as judged by the reproduction rate, is resistant to both colchicine and acenaphthene. The latter immunity is not specific for colchicine and may be of the type found in organisms which do not naturally contain colchicine.

451.

SAKAI, K.

576.353:633

(Diurnal periodicity of somatic mitosis in the root-tips of several crop-plants).

Jap. J. Genet. 1941 : 17 : 35-40.

Diurnal periodicity of somatic mitosis in the root tips of one month old plants of *Oryza sativa* L., *Hordeum vulgare* L., *Triticum vulgare* Vill., *T. Spelta* L., *T. monococcum* L., *Secale cereale* L., *Phaseolus angularis* Wight, *Ph. vulgaris* L., *Cannabis sativa* L., *Solanum tuberosum* L. and *Vicia Faba* L. was investigated.

The main periods of nuclear division of most plants were shortly after 12.30 a.m. and p.m. Though differences are visible in the type of the periodicity curves, two main dividing periods are clearly seen in all plants except *Vicia*. Legumes and potatoes show a fairly distinct periodicity; hemp and some of the cereals show a secondary dividing period besides the primary one; and in *T. monococcum* and rye no periodicity is apparent.

Tables and figures are provided as an assistance in cytological studies and in experiments on the influence of chemical or physical agents on the chromosome or on nuclear division.

452.

SAX, K.

576.356:537.531

The mechanisms of X-ray effects on cells.

J. Gen. Physiol. 1942 : 25 : 533-37.

"Irradiation of Tradescantia pollen grains does not increase subsequent sensitivity to X-rays as measured by the frequency of induced chromosomal aberrations during the nuclear cycle.

"The physiological effect of X-rays appear to be of minor importance in causing injury or death of individual cells and most of the deleterious effects can be attributed to 'direct hits' which produce chromosomal alterations. In the reaction of tissues to X-rays the physiological effect may play a more important part."

Author's summary.

453.

MÜNTZING, A. and

576.356.5(48.5)

LEVAN, A.

575:633(48.5)

Berättelse över verksamheten vid Sveriges Utsädesförenings kromosomavdelning under tiden 1 oktober 1935 - 30 september 1940. (Report on the activity of the chromosome division of the Swedish Seed Association during the period October 1st 1935 - September 30th 1940).

Sverig. Utsädesfören. Tidskr. 1941 : 51 : 83-93.

This report continues the account of the researches of the chromosome division after the first four years of its activities (see "Plant Breeding Abstracts", Vol. VI, Abst. 808) for a further 5-year period. In timothy, a triploid was obtained by the twinning method from unknown material and its progeny out-yield the other forms. From these results it was argued that still higher yields should be obtained from triploids of élite material. Already 3 strains have been produced which have yet to be multiplied and tested. It is also noted that the tendency to form multivalents, which produces a certain sterility, is not present in the high-chromosome forms. In *Dactylis* the 42-chromosome types produced by crosses with *D. Aschersoniana* have not proved of economic value. However, plants with \pm 28 chromosomes from the cross (*D. glomerata* x *D. Aschersoniana*) x *D. glomerata* have a high weight and good seed production.

The results have been fully described by Müntzing (*Hereditas*, Lund 1937 : 23 : 113-235). Meadow grass has been shown to be propagated for the most part apomictically. New biotypes produced by the twinning method are therefore of special interest and a series of twins with 50% higher chromosome number than normal have been produced (see "Plant Breeding Abstracts", Vol. X, Abst. 773).

Tetraploid red clovers have been produced by the colchicine method and so far as can be judged at present, they are of stronger growth and greater vitality than the original diploid material. Tetraploid plants of white and alsike clover have also been found.

Tetraploid plants from the potato variety Triumph have been obtained by means of Jørgensen's method and from the varieties Birgitta and King George by colchicine. Tetraploid plants of both sugar and forage beet have been obtained with a high vitality and larger and broader leaves. Seed setting is good and sterility low.

A number of tetraploid plants of flax have been produced by colchicine; though they are of high vitality their fertility is lower than that of the diploids. A certain amount of variation, however, suggests that by crossing and selection this may be improved.

The tetraploid soya bean plants are very much larger and stronger and the leaves are larger and broader as compared with the diploids, but the fertility is lower.

Work on wheat-rye hybrids with 56 chromosomes is also in progress.

A large number of tetraploid barley plants have been produced by the temperature shock method. The low yield of the first tetraploid has been improved by crossing. Preliminary tests show a higher protein content than the diploids.

Studies are being made on a tetraploid rye from the U.S.A.

Researches are being made to find substitutes for colchicine.

Future work includes the possibility of the improvement of the fertility of tetraploids.

R. M. I.

454. MÜNTZING, A.

576.356.5:575:633

Polyploidi och växtförädling. (**Polyploidy and plant breeding**).

Sverig. Utsädesfören. Tidskr. 1941 : 51 : 307-16.

After some general remarks on the nature of polyploidy, the author deals more particularly with some of the results of the researches of that section of the Plant Breeding Institute dealing with chromosomes. That there is an optimum chromosome number, which when exceeded leads to unsatisfactory results, is shown by potatoes where up to the present all varieties with a doubled chromosome number have less vitality and a worse tuber production than the original material. It is not yet determined if the optimum for potatoes is 48 or more probably 60 or 72. In flax also the tetraploid with 60 chromosomes has only 10% of the fertility of the diploid. This is unfortunate, as in the linseed the tetraploid has a somewhat greater degree of vegetative development than the original material. The sterility is gene conditioned and the outlook for improving the condition is not regarded with optimism.

The first variety of tetraploid barley came from an ear of Opal B, bred by the heat-shock method. Other tetraploid material has been produced by crossing 6-rowed winter barley with 2-rowed spring barley (Primus II) and subjecting the ears to heat. Progeny of the tetraploids so produced are now in the F_5 . The tetraploid Opal B, though fertile, has a very low yield and would be of little practical value if it were not for its high 1,000 grain weight and very high protein content. Fortunately the other tetraploids have a much better yield.

Selection among the later progenies has produced strains with better and worse yields and the production of as many new tetraploid lines as possible as a basis for further selection is suggested as a means of improving the yield.

Tetraploid rye has been produced by means of colchicine from Stål, Vasa II and Kungsårg. Wheat-rye hybrids with 56 chromosomes have also been produced by the colchicine method. Tetraploid sugar beet in 1940 had about the same weight and sugar content as the diploid, is very fertile and can be easily crossed with the diploid. This is of interest as it has been found that triploids have a higher sugar production than diploids.

Plants of timothy with 63 chromosomes have been obtained by the twinning method. They have high fertility and some lines have higher weight in comparison with the variety Gloria. Several of the plants show a tendency to stabilize themselves with ± 56 chromosomes. The 84-chromosome type produced by means of colchicine has proved to be above the optimum. In clover, doubling has been produced by colchicine in red, white and alsike clovers. The work on the red clover is the most advanced. The tetraploids come from strains of Merkur,

Wambåsa, Offer and Ultuna and crosses between them. Comparisons of diploid and tetraploid material show higher figures for the tetraploid for green mass, average weight per plant and total dry weight but the percentage of dry substance is slightly less than that of the diploids.
R. M. I.

455. SCHRÖDERHEIM, J. 576.356.5:577.16:634.74
Untersuchungen über den Ascorbinsäuregehalt in Hagebutten. (**Investigations on the ascorbic acid content of hips.**)
Acta Univ. Lund 1941 : 37 : No. 9 : Pp. 57.
K. Fysiogr. Sällsk. Handl. 1941 : 52 : No. 9.

The ascorbic acid content of rose hips is as a rule at its maximum about the end of September and the beginning of October and does not always correspond with a particular stage of ripeness. It is very dependent on the weather.

Certain species showed a higher content than others, but there was no relation between chromosome number and ascorbic acid content.
R. M. I.

456. SATÔ, D. 576.356.5:581.02
(**Experimental production of haploids and polyploids. II and III.**)
Bot. and Zool. 1938 : 6 : 423-30, 595-608.

Continuing his review of research on the production of haploid and polyploid gametes and plant forms (cf. "Plant Breeding Abstracts", Vol. XII, Abst. 990), the author discusses causal factors such as temperature, X-rays, chemical substances, grafting, noxious insects, manipulation (e.g. the pricking of flower buds with a needle), diseases, dormancy and age of pollen, before finally analysing the results obtained in various countries on polyploidy resulting from hybridization: a very large number of plants are included in this review in which the contributions of Japanese investigators are well represented.

Part III deals mainly from the cytological aspect with the subject with reference to Japanese and other research on cereals, *Brassicae*, *Solanum*, *Gossypium*, *Papaver*, *Morus*, *Allium*, *Petunia*, *Digitalis*, *Populus* and many other genera.

457. CIFERRI, R. 576.356.5:581.04
L'impiego della colchicina in biologia. (**The use of colchicine in biology.**)
Saggiatore 1941 : 2 : p. 261.
(From *Züchter* 1942 : 14 : p. 220.)

A short survey (for Italian readers) of the literature up to 1940 on the use of colchicine to produce polyploids.

458. LITTLE, T. M. 576.356.5:581.04
Tetraploidy in *Antirrhinum majus* induced by sanguinarine hydrochloride.
Science 1942 : 96 : 188-89.

In December, 1941 (apparently at Beltsville, Md.) 100 seedlings of *antirrhinum* were treated by placing a drop of 0.2% sanguinarine hydrochloride on the terminal growing point of each. Controls consisted of 100 plants treated with 0.2% colchicine, 100 with 0.2% lycorine and 100 plants untreated. The toxic effect of the sanguinarine was quickly evident in dead tissue where the drop had been applied. Seedling growth was at first retarded but later recovered. Eighteen plants were selected as showing abnormal growth. Nine of these were lost owing to faulty handling. Of the rest 5 were found to be tetraploids and 4 diploids. No tetraploids were found among the untreated plants or those treated with lycorine. Four appeared in those treated with colchicine, though it is noted that a much higher percentage of tetraploidy has been induced by colchicine by repetition 3 or 4 times at 3-day intervals of the above treatment. Preliminary experiments indicate that the effect of sanguinarine on mitosis in excised tips of *Lilium* is similar to that of colchicine in producing shortened and split "C-chromosomes". A more detailed account of these studies is promised later.

459. *KOSTOV, D. 576.356.5:581.04:633:581.6
[**New plants obtained by chromosome doubling (polyploidy).**]
Zemledelie, Sofia 1939 : 43 : 18-23.

A review of the results obtained by chromosome doubling in various economic plants by colchicine and acenaphthene and other treatments. Special attention is directed to the

* A full translation of this paper is on file at the Bureau.

effects in *Nicotiana* species in which valuable characters such as frost resistance may be intensified in the polyploid.

The predictable changes obtained by chromosome doubling are contrasted with the non-predictable ones obtainable by gene mutation and their economic value is stressed.

460. SIMONET, M. and ARMENZONI, F. 576.356.5:581.04:633.11
Anomalies de la caryocinèse dues à l'action des dérivés iodés des carbures cycliques. (**Anomalies of karyokinesis due to the action of iodized derivatives of cyclic hydrocarbons**).
C.R. Acad. Sci. Paris 1939 : 209 : 354-56.

The results of treatment of root tips of wheat and flax with mono-iodobenzene and α -iodonaphthalene are reported. The plants reacted in different ways to the two substances. Polyploidy was induced in wheat by the α -iodonaphthalene. R. M. I.

461. STOUT, A. B. and CHANDLER, C. 576.356.5:581.162.5:575
Hereditary transmission of induced tetraploidy and compatibility in fertilization.
Science 1942 : 96 : 257-58.

Tetraploidy was induced by colchicine in the branches of self-incompatible plants of *Petunia axillaris* and this was accompanied by a change to compatibility which was transmitted to the tetraploid off-spring. All seedlings from the tetraploid plants were tetraploid and all were self-compatible and also cross-compatible in all possible intra-sib cross-relations. R. M. I.

462. SPARROW, A. H., RUTTLE, M. L. and NEBEL, B. R. 576.356.5:581.162.5:576.354.4
Comparative cytology of sterile intra- and fertile inter-varietal tetraploids of *Antirrhinum majus* L.
Amer. J. Bot. 1942 : 29 : 711-15.

In the light of his own investigation on the relationship of meiotic chromosome behaviour to sterility in autotetraploid snapdragons, the author discusses the findings of other workers on the general problem of intra-varietal sterility in autotetraploids. He concludes that a relatively higher homozygosity of the intravarietal tetraploids as compared with the inter-varietal is probably the main cause of their greater sterility. He found no correlation between sterility and the mean number of quadrivalents, nor was the sterility due to lack of pollen.

BOTANY 58

463. MELCHERS, G. 581.143.26.03:577.17
Die Auslösung des generativen Entwicklungsabschnittes der höheren Pflanzen. (**Induction of the reproductive phase in higher plants**).
Züchter 1942 : 14 : 177-82.

A brief review is given of the literature on vernalization and photoperiodism. The hormone explanation is regarded as having more foundation than the principle of phasic development, though experiments to demonstrate the actual existence of a hormone have so far failed.

464. GUSTAFSON, F. G. 581.163
Parthenocarp: natural and artificial.
Bot. Rev. 1942 : 8 : 599-654.

Having considered the various definitions of the term parthenocarp, the author passes to a detailed survey of the literature (since 1890) on natural and induced parthenocarp and on the techniques used in inducing the condition. The discussion deals with any work that has been done on the various qualities and cytological features of parthenocarpic fruits and on their different causes including the possible rôle of growth hormones. The bibliography contains 174 references.

465. TIPPO, O. 582:578.08
A modern classification of the plant kingdom.
Chronica Botanica 1942 : 7 : 203-06.

Some of the deficiencies and discrepancies in existing systems of plant classification, both old

and new, are pointed out, as well as the lack of uniformity in the schemes used for the plant and for the animal kingdoms. The author has constructed a classification which is intended to incorporate the latest sound developments in all the branches of plant phylogeny and in which the various groups are named in such a way as to indicate rank or degree of affinity and the various group names are brought into conformity with zoological taxonomy.

SEED PRODUCTION 631.531.12

466. TALLARICO, G. 631.531.12:551.56(45)
L'Italia centro mediterraneo di diffusione delle sementi elette. (Italy, the
Mediterranean centre for distribution of selected seed).
Ital. Agric. 1942 : 79 : 455-64.

It is pointed out that in the warm sunny climate of the Mediterranean flowering is more abundant, the ratio of seed to straw or wood is higher than in the northern climates and the ratio of embryo to endosperm is also higher. Such seeds, it is claimed, have a higher energy of germination. The Mediterranean basin, and Italy in particular, are suggested as the most suitable centre for the production of selected seeds for the rest of Europe. Trials have shown that seed from northern varieties when produced in the south and sown in the north gives better yields than locally produced seed.

DISEASES AND PESTS 632

467. PUNYASINGHA, T. 632.3:576.16:635.655
The relation of varieties of the soybean to various strains of the
***Rhizobia*.**
Thai Sci. Bull. 1941 : 3 : No. 1 : 11-27.
[From Exp. Sta. Rec. 1942 : 86 : 601-02].

The host origin of a strain of *Rhizobium* influenced its activity. Some cultures seemed more efficient in inoculating one variety of soya bean than others but no culture gave the best inoculation on all the 44 soya bean varieties tested. Certain definite strains of soya bean bacteria would seem to be required to produce the most efficient degree of nodulation on a given variety.

468. RIZET, G. 632.42:575.061.6
De l'hérédité du caractère absence de pigment dans le mycélium d'un
Ascomycète du genre *Podospora*. (On the heredity of the character,
absence of pigment, in the mycelium of an ascomycete of the genus
Podospora).
C.R. Acad. Sci. Paris 1939 : 209 : 771-74.

Podospora anserina shows two forms, one, the normal with a dull green mycelium and the abundant aerial filaments bearing few microconidia, the other with a colourless mycelium, the aerial filaments bearing only microconidiophores with numerous microconidia, these latter showing under certain conditions a characteristic salmon pink coloration. The results of the combinations green x green, colourless x colourless and green x colourless are described and demonstrate the unusual case of dominance of the absence of pigment in a dihaploid organism.

R. M. I.

469. SCHWALB, H. 632.8
Abriss über den derzeitigen Stand der Virusforschung. (Sammelreferat).
[Outline of the present position of virus research. (Review of Literature).]
Züchter 1942 : 14 : 167-75.

The author outlines the present knowledge regarding the history of virus diseases and their typical symptoms, the production of crystals, chemical composition, reaction to heat and other agencies, methods of reproduction and dissemination, the various types of resistance and their inheritance and lastly the nature of viruses.

470. KÖHLER, E. 632.8:575.243:581.036.1:633.71
Ueber vergebliche Versuche, beim Tabakmosaikvirus "Mutationen" in
Rohsäften zu erzielen. (Unsuccessful attempts to produce mutations
of the tobacco mosaic virus in fresh sap).
Z. PflKrankh. 1942 : 52 : 392-97.

Sap was expressed from Samsun plants infected with the green tobacco mosaic virus, which

frequently gives rise to yellow strains, especially at high temperatures; one lot of sap was exposed for 10 minutes to a temperature of 86° C., another to 46° C. and a third, untreated, served as control. All infections produced by inoculating with the treated sap produced normal green symptoms and no yellow mutant was observed. Similar attempts to produce mutations in the yellow strain were also fruitless.

ECONOMIC PLANTS 633

471. JOAQUIM BARROSO, L. 633:582(81)
Chaves para a determinação de gêneros Brasileiros e exóticos das dicotiledon-
eas mais cultivadas no Brasil. (**Keys for the determination of the**
Brazilian and exotic genera of dicotyledons most cultivated in
Brazil).
Bol. Soc. Brasil. Agron. 1942 : 5 : 173-82.

A dichotomous key is given for the determination of the Brazilian cultivated plants, with indications of those that are exotic and illustrations of some of the more interesting.

472. 633:608.3
La protection juridique des variétés des plantes. (**The legal protection**
of plant varieties).
15th Actes Inst. Int. Agric., Rome 1940 : 267-88.
[From Rev. Int. Industr. Agric. 1941 : 3 : Abst. 1691].

An examination of the question of an international scheme for protecting plant varieties. Existing legislation in countries that have adopted such protection is considered with information on certain countries that are without any special legislation of this kind.

473. ÅKERMAN, Å. 633-1.4:575(48.5)
Förädling av åkerbruksväxter för sandjord. (**The breeding of agri-
cultural crop plants for sandy soil**).
Sverig. Utsädesfören. Tidskr. 1941 : 51 : 184-88.

The most suitable plants for this kind of soil are rye, potatoes, lupins and, in certain cases, blue lucerne. The best variety of rye for light soil is Petkus. There are also some varieties of wheat that are more or less suitable for dry, light soils and from a cross of the American variety Turkey, a strain (01200) has been produced and crossed with some varieties from southern Sweden, giving the variety 01312, a stiff-strawed hardy and early combination. Of oats, Guldregn I and II are suitable varieties and crosses have been made with old Swedish land oats from Småland and with Spet oats and Hede oats known for their drought-resistant properties. As the most suitable crop for sandy soil, potatoes have special importance. Breeding work has been described by Ö. Tedin and is not further mentioned here. On soils with slightly more humus the forage sugar beet Rubra II can be grown. More suitable than beets for this type of soil are turnips and carrots. Bortfeldern is the best turnip. Breeding could be done with advantage on both these crops.

There are several suitable kinds of grass but no really suitable leguminous forage plants. For better, but not lime-deficient sandy soils, blue lucerne is a useful plant in southern Sweden. Yellow lucerne grows naturally on sandy soil and in dry summers is often the only plant to produce any fodder to speak of. Among newly introduced plants certain varieties of sweet lupins, soya and maize can all be grown on light soils. Of soya, the brown seeded varieties Wilnensis from Poland and the black seeded Altonagaard A1 from Denmark are suitable. Breeding for soya beans that are earlier and higher yielding is in progress. The early varieties of maize, Manalta, from Canada, can be grown in certain districts. Poppies, especially the German variety Mahndorfer can also be grown. R. M. I.

474. POPENOE, W. 633-1.524(72.83)
Plant resources of Honduras.
Chronica Botanica 1942 : 7 : 217-19.

An account is given of the natural resources of Honduras and especially its wealth of economic plants, both indigenous and imported, e.g. timber trees, cereals, sugar cane, indigo, rubber, bananas and numerous other fruits including many rare varieties of *Citrus*, oil plants (*Aleurites* species, oil palms), etc. Cacao, though of no present importance, would offer future possibilities for the export trade if high quality strains were grown.

The Lancetilla Station (near Tela), among other bodies, has made extensive collections of many important crop plants and has actively promoted their development and improvement as economic assets.

475. BRIGGS, F. N. 633-2-1.521.6:575:578.08
Breeding disease-resistant crops.
 Science 1942 : 96 : p. 60.

To avoid the introduction of susceptibility to some other diseases when breeding for resistance for some specific disease, the use of the back-cross method of breeding is recommended.

R. M. I.

CEREALS 633.1

476. 633.1:575(48.5)
 575:633:061.6(48.5)
 En arbetets fest på Weibullsholm. (A research celebration at Weibullsholm).
 Lantmannen 1941 : 25 : 601-02.
 Weibullsholm fyller 70 år och inviger samtidigt landets modernaste renserier och lagerlokaler. (Weibullsholm completes 70 years and inaugurates at the same time the country's most modern winnowing and storage plant).
 Ibid 1941 : 25 : 585-86.

The first paper gives an account of a visit to Weibullsholm which has contributed to make Sweden nearly self-supporting in regard to seed of agricultural and horticultural crops and in cereals. In addition to its collaboration in promoting seed control in Sweden the following new cereals have been recently produced:—

The winter wheat Eroica from the cross Bankuter 178 x Standard, released in 1942 and equalling Åring in winter-hardiness, while surpassing existing varieties in yield.

The new Barley Balder which surpasses Kenia in yield by 9%.

The second paper briefly records past and present achievements at the Institute and the dedication of the new grain store and winnowing plant.

477. KONDO, N. 633.1:576.356.5:581.162.5
 (Chromosome doubling in *Secale*, *Haynaldia* and *Aegilops* by colchicine treatment).
 Jap. J. Genet. 1941 : 17 : 46-54.

Colchicine treatment of *Secale cereale*, *Haynaldia villosa*, *Aegilops bicornis*, *Ae. comosa*, *Ae. squarrosa* and *Ae. uniaristata* and in a sterile hybrid *Ae. caudata* x *Ae. umbellulata* resulted in doubling of their chromosome numbers. The 4x-plants had the gigas habit. Epidermal cell elements of 4x leaves attain a length about $1\frac{1}{2}$ times that found in normal plants. Good pollen grains of 4x plants are larger than those of diploids.

Ae. caudata x *Ae. umbellulata* produced only aborted pollen, whereas the amphidiploid has good pollen grains.

The chromosome configuration found in most pollen mother cells of *S. cereale* and *H. villosa* was $1_{IV} + 1_{III} + 10_{II} + 1_I$ and $2_{IV} + 10_{II}$ while in the autotetraploids of *Ae. bicornis*, *Ae. squarrosa* and *Ae. uniaristata* 2-5 polyvalents were formed at metaphase I. In the amphidiploid 0-2 polyvalents and 0-5 univalents were observed.

The fertility of normals, autotetraploids and amphidiploids is recorded in tabular form.

WHEAT 633.11

478. BERG, S. O. 633.11:575(48.5)
 Weibulls Eroicavete. Ny höstvetesort för södra och östra Götlands slättbygder. (Weibulls Eroica wheat. A new winter wheat for the plains of south and east Götland).
 Weibulls 111. Årsb. 1942 : 37 : 28-31.

Eroica is derived from the cross (Bankuter 178 x Standard) x Åring.

In winter-hardiness it can be compared with Åring II. It has a high yield, is relatively resistant to disease and has stiff straw.

R. M. I.

479. BALAŠEV, I. S. and PETROV, I. P. 633.11:575:578.08(47)
(Growing spring wheat and *Triticum-Agropyron* hybrids in green-houses as a method of accelerating breeding).
 Theses and scientific papers read at the 4th District Conference of Workers of Universities and Research Institutions, Omsk 1941 : No. 1 : Agron. Sect. 47-48.

Details are given of the method of greenhouse cultivation used for Siberia. The seed is sown in January or late December, the temperature is kept at 20° C. till germination, then 5-12°, electric light is used at night in February, March and April. With proper conditions of manuring and watering ripe seed can be obtained at the end of April.

480. CHEVRETTE, J. E. 633.11:575"793"
 633.11:575.11
Inheritance of earliness and other characters in spring wheat.
 Cornell Univ. Abstr. Thes. 1941 (1942) : 322-23.

Earliness was dominant over lateness in crosses involving 5 varieties of Canadian wheats though F_2 's gave approximately a 3 : 1 ratio. F_3 families showed all degrees of earliness within the limits set up by the parental ranges indicating the existence of a number of independent multiple factors having a cumulative effect. The "awned" character was dominant over awnlessness and governed by duplicate genes. In one cross awning was associated with earliness. The dominant characters "pubescence" and "brown colour" of glumes were dependent on single genic difference. E. K. J.

481. NOVITSKII, S. P. 633.11:575.127.5:633.289
 633.11-2.4-1.521.6:575.127.5
(Resistance of *Triticum-Agropyron* hybrids to the main cereal diseases).
 Theses and scientific papers read at the 4th District Conference of Workers of Universities and Research Institutions, Omsk, 1941 : No. 1 : Agron. Sect. 58-60.

More of the hybrids were resistant to *Tilletia* than to *Ustilago*; many were highly resistant to rust. They were more resistant than *Milturum* 0321 to *Helminthosporium*, *Fusarium* and other diseases causing shrivelled grain. Some hybrids were classed as highly resistant to one or other of the above fungi.

482. PUNIČ, A. E. 633.11:575.127.5:633.289
(Results of 3 years' tests of annual spring forms of *Triticum-Agropyron* hybrids).
 Theses and scientific papers read at the 4th District Conference of Workers of Universities and Research Institutions, Omsk, 1941 : No. 1 : Agron. Sect. 57-58.

During the period 1938-40 tests were made of 93 hybrids of *A. glaucum* and *A. elongatum*. The annual spring forms were found to have a higher survival value than the standard wheat varieties *Milturum* 0321 and *Caesium* 0111, they were much more resistant to spring and summer droughts, and more resistant also to rust, smuts, lodging and shedding. They yielded more than the control and the grain is of very high baking quality. The hybrids are not exacting as regards soil fertility, but respond well to manuring. They are somewhat late in maturity, ripening with *Caesium* 0111 or a few days before it.

483. ŽIGALOV, S. A. 633.11:575.127.5:633.289
 633.11-2.111-1.521.6:575.127.5
(Investigation of the winter-hardiness of hybrids from crosses of winter wheat with couch).
 Theses and scientific papers read at the 4th District Conference of Workers of Universities and Research Institutions, Omsk 1941 : No. 1 : Agron. Sect. 53-56.

The hybrids vary very much in their rate of seedling development; those seedlings that have only reached the 2-3 leaf stage at the beginning of the winter usually die. Certain spring forms also segregate out and these also perish. In the severe winter of 1938-39 the later

generation hybrids survived better than the hardy wheat *Lutescens* 0329 and the hardy rye Omka, particularly when spring sown. The perennial hybrids were found to be hardier in the earlier years of their development and became progressively less hardy with each year of growth. Some of the best hybrids of the wheat type exceeded 0329 and Omka in grain yield.

484. FRÖIER, K.,
GELIN, O. and
GUSTAFSSON, Å. 633.11:576.356:537.531
The cytological response of polyploidy to X-ray dosage.
Bot. Notiser 1941 : 199–216.

The amount of mitotic disturbances induced in dormant seeds by different X-ray dosages was examined in *Triticum monococcum* ($2n = 14$), *T. dicoccum* ($2n = 28$), *T. durum* ($2n = 48$), *T. vulgare* ($2n = 42$) and *Avena sativa* ($2n = 42$).

At 5,000 r. the frequency of disturbed cells was in all cases directly proportional to the degree of polyploidy. At 10,000 r. diploid and tetraploid species continued to be in proportion while the hexaploid *T. vulgare* was less affected than expected.

Avena sativa was less damaged at 5,000 to 15,000 r. than *T. vulgare*.

The germination and sprouting ability of the hexaploids and tetraploids were unaffected even when the mitotic disturbances were very high, but a pronounced decrease in growth was noticeable in the diploid.

E. K. J.

485. SPASOJEVIĆ, V. 633.11:576.356.5:581.331.2
Beziehungen zwischen der Zahl der Chromosomen (n) und der Grösse der
Pollenkörner beim Genus *Triticum*. [Relation between chromosome
number (n) and the size of pollen grains in the genus *Triticum*].
Züchter 1942 : 14 : 215–17.

Data are presented on the length and breadth of the pollen grains in species of the diploid, tetraploid and hexaploid series. The means were found to be different in the 3 groups and although the variation in each was considerable the 3 groups did not transgress. The average length of the pollen grain was 47.7 microns in *T. monococcum*, 54.4 in the tetraploid group and 61.7 in the hexaploids, the respective breadths were 41.2, 47.6 and 54.3.

486. KIHARA, H. 633.11:576.356.52:581.162.3:575.127.2
(Haploids produced by delayed-pollination in einkorn wheat).
Agric. and Hort. [1940] : 15 : No. 5 : p. 194.

Experiments with pollen of *Triticum aegilopoides* var. *boeoticum*, var. *Larionwi*, etc., applied on einkorn from two to nine days after emasculation showed that pollination was the most successful after a 5-day interval, while after 2 days crossing gave poor results. With intervals of 6 days and longer haploids were found to occur. All the haploids were morphologically identical with their female parents.

The author, accepting Katayama's views on embryo development in such strains of einkorn (cf. "Plant Breeding Abstracts", Vol. IV, Abst. 372), attributes the origin of these haploids to haploid parthenogenesis and fertilization of the polar nuclei only, followed by endosperm development, enabling the seeds to grow to maturity.

487. KNJAGINIČEV, M. I.,
MUTULJ, I. F. and
PALILOVA, J. K. 633.11:577.15
**(The activity of carbohydase in the ripening grain of different
wheat varieties).**
Biohimija 1940 : 5 : 288–300.

This is a comparative study of the synthetic action of carbohydase in the ripening grain of different wheat varieties, and of the effect of different temperatures upon such action. The relation of carbohydase to the proteins in the grain was also investigated.

The wheat varieties were sown in 1939 at the Pushkin Experimental Station near Leningrad and the grain obtained from them was studied when in the milky, waxy and fully ripe stages. The authors describe their method of estimating quantitatively the synthetic action of the carbohydase in the grain.

Carbohydase in one variety of wheat differed from that in another in respect of sensitivity to temperature; a stimulation of synthetic activity as a result of an increase in temperature was very much less evident in the grain of early-ripening varieties than of late-ripening. I. Z.

488. KNJAGINIČEV, M. I. and PALILOVA, J. K. 633.11:577.15:576.16
(The action and quality of catalase in wheats, barleys and plants of genera related to that of wheat).
 Biohimija 1940 : 5 : 55-64.

Desiring to study changes in the action of catalase in various gramineous plants as a function of their adaptability to outside conditions, and to observe if differences in such action are detectable between different species and genera, the authors investigated the changes in the values of μ (energy of activation) and Q_{10} (temperature coefficient) of catalase at different stages of development of several gramineous plants.

The more noticeable changes which were observed took place during the course of the day, and under the influence of manures. Comparatively high values were observed among the ancient forms, such as *Aegilops* and *Haynaldia*, a phenomenon which may prove useful in ascertaining the phylogenetic relationship between genera. I. Z.

489. CLARK, J. A. and BAYLES, B. B. 633.11:582(73)
 633.11:575(73)
Classification of wheat varieties grown in the United States in 1939.
 Tech. Bull. U.S. Dep. Agric. 1942 : No. 795 : Pp. 146.

This is a classification of the wheat varieties grown commercially in the United States with detailed descriptions and history of origin and distribution. E. K. J.

490. DINES, F. T. 633.11:582:581.48
The determination of wheat varieties by kernel characteristics and some of its uses.
 23rd Rep. Int. Crop Impr. Ass., Chicago 1941 : 45-54.

This method is based upon 10 primarily heritable characteristics of wheat kernels such as length, breadth, size, shape of germ, type of back, brush, sides, peak, cheek, crease and ventral surface. Colour and texture are also used to a limited degree. E. K. J.

491. TOKUDA, Y. 633.11-2.111-1.521.6:575(52)
(Relation of sowing time to snow-resistance in wheat-varieties).
 Pl. Breed. News 1936 : 123-32.

At the Niigata Prefecture Experiment Station extensive comparative experiments were carried out on the performance of nearly 100 varieties of wheat under conditions of snow with varying dates of sowing, the ultimate object being the selection of varieties with a long period during which they can safely be sown under snowy conditions. The parentage of a few of the Japanese strains is given.

The variety Aka-gawa-aka ranked high among the "safe" varieties and some other strains also being grown at the Station showed valuable features from the point of view of snow resistance. It should, it is thought, be possible to breed new varieties in which this character is even more marked than in Aka-gawa-aka.

492. SISAJAN, N. and KOBJAKOVA, A. 633.11-2.112-1.521.6:577.15
(The prevailing direction of enzyme action as an indication of drought resistance in cultivated plants. IV. The effect of wilting upon esterification and the hydrolysis of phosphoric esters in plants.)
 Biohimija 1940 : 5 : 225-33.

The authors undertook to study the synthesizing and hydrolizing functions of phosphates, during the progressive wilting of the leaves of 12-day-old wheat plants of different varieties: some resistant to drought, others not.

It was found that the synthesizing powers of phosphatase declined as wilting progressed, disappearing entirely when the moisture deficit was between 30% and 40%, but revived once more when it was between 40 and 50%. During the same period, hydrolysis by phosphatases increased steadily. In all the wheat varieties tested the above description, in general, held true; in the variety, Novinka, the synthesizing powers ceased at 40%, and in Graecum 0289, Melanopus 069, Lutescens 062 and Garnet, at 30%. The last mentioned variety, unlike the others, did not recover these powers without some delay. I. Z.

493. CLAASSEN, C. E.,
VOGEL, O. A. and
GAINES, E. F. 633.11-2.451.3-1.521.6:575.11
**The inheritance of reaction of Turkey-Florence-1 x Oro-1 to race 8
of *Tilletia levis*.**
J. Amer. Soc. Agron. 1942 : 34 : 687-94.

The genetic interpretations given are based upon apparent segregations of two pairs of factors for bunt (*T. levis*) reaction in wheat, the two factors having unequal weights. E. K. J.

494. WADA, E. and 633.11-2.8-1.521.6(52)
FUKANO, H. 633.11.0014(52)
(Resistance of wheat varieties to yellow mosaic).
Pl. Breed. News 1935 : 153-64.

Experiments were made on the effects of delayed sowing upon infection of Japanese wheat varieties by yellow mosaic; and the results with those from a variety trial comprising 28 Japanese varieties are taken as indicating that:—

- (1) No variety of wheat is entirely resistant to yellow mosaic and the breeding of an immune wheat is almost impossible;
- (2) Nevertheless there are varieties sufficiently resistant to the disease for practical purposes—and such useful forms should be bred;
- (3) Some susceptible types may comprise varieties that can escape the disease if their sowing time is delayed.

495. BERG, S. O. 633.11:664.641.016(48.5)
Stråsådesodlingens äggviteproblem. **(The protein problem in cereal
cultivation).**
Weibulls 111. Årsb. 1941 : 36 : 14-32.

The problem of increasing the protein content of the grain while maintaining a high yield is discussed and while breeding may bring about the desired result, experiments are described to show that this is also possible by means of suitable manuring. R. M. I.

OATS 633.13

496. TÖRNQVIST, G. I. 633.13:575(48.5)
Svalöfs Samehavre (01341). Ny havresort för nordligaste Sverige. [**Svalöf's
Same oats (01341). A new variety of oats for the most northerly
parts of Sweden**].
Sverig. Utsädesfören. Tidskr. 1941 : 51 : 383-85.

Same oats, from the cross Sv 25/356, a selection from a Norbotten land oat x Orion II, is shown to have a higher yield than Orion II, better stiffness of straw, slightly earlier ripening and to be its equal in quality. R. M. I.

497. REED, G. M. 633.13-2.451.2-1.521.6:575.11
Inheritance of smut resistance in hybrids of Navarro oats.
Amer. J. Bot. 1942 : 29 : 308-14.

The chief value of Navarro oats is its resistance to smut and crosses were made with it and the varieties Hull-less, Black Mesdag and Gothland. The reaction of the hybrids, numbers 90, 91 and 92 respectively in the F_2 and F_3 , inoculated variously with races 1, 12 and 10 of *Ustilago avenae* and races 1, 7 and 9 of *U. levis* are recorded in detail.

The data in general suggest that in the crosses of Navarro with Hull-less and with Gothland, there are two independent factors for resistance to race 1 of *U. avenae*. Three independent factors for the resistance to races 1 and 7 and *U. levis* would fit the data in the cross Navarro x Hull-less while possibly as many as five factors are necessary in the cross Navarro x Black Mesdag inoculated with races 7 and 9 of *U. levis*. In the cross Navarro x Hull-less inoculated with race 12 of *U. avenae* the results suggest that susceptibility may be dominant. Of 225 F_3 progenies only 26 were resistant. Navarro, Hull-less, Black Mesdag and Gothland are also resistant to the Red Rustproof race of *U. avenae* 10. Only occasional infected plants were found among the F_3 progeny of the crosses of Navarro with Hull-less and Gothland. R. M. I.

498.

TOKHTUEV, A. V.

633.13-2.7-1.521.6

633.16-2.7-1.521.6

(Reaction to "Zakuklivanie" of different varieties of barley and oats).

Theses and scientific papers read at the 4th District Conference of Workers of Universities and Research Institutions, Omsk 1941 : No. 1 : Agron. Sect. 69-71.

This disease, caused by the attack of certain cicadas, is best prevented by producing resistant varieties. No oat variety possesses complete resistance, though clear differences in susceptibility are observed. Certain barley varieties in the world collection have proved highly resistant.

RYE 633.14

499.

MÜNTZING, A.

633.14:576.356.4:581.48

Genetical effects of duplicated fragment chromosomes in rye.

Hereditas, Lund 1943 : 29 : 91-112.

The offspring of a rye plant with two extra fragment chromosomes gave material with the number of fragments ranging from 0-8. The genetical effects of the fragments were studied on a total of 308 plants. There was a marked and significant though non-linear negative correlation between number of fragments and the following properties: Kernel weight per plant; number of kernels per ear; percentage of seed setting and pollen fertility. These measurements demonstrate that the duplicated fragments are not inert.

E. K. J.

500.

MÜNTZING, A.

633.14:576.356.5:581.48

Aneuploidy and seed shrivelling in tetraploid rye.

Hereditas, Lund 1943 : 29 : 65-75.

Tetraploid rye produces a proportion of aneuploids besides euploids with $2n = 28$. Average seed samples could be classified as good or bad according to the normal or shrivelled condition of the endosperm. Plants from shrivelled seeds more frequently had aberrant chromosome numbers than those from good kernels, seeds containing hypotetraploid embryos being on an average less well developed than seeds containing hypertetraploid embryos. The same phenomenon was observed in diploid and aneuploid descendants of triploids and triploid derivatives. This is explained as due to the disturbed quantitative relations between the chromosome numbers of embryo, endosperm and surrounding tissue.

E. K. J.

MAIZE 633.15

501.

SPRAGUE, G. F. and

TATUM, L. A.

633.15:575.12

General vs. specific combining ability in single crosses of corn.

J. Amer. Soc. Agron. 1942 : 34 : 923-32.

By general combining ability the authors mean "the average performance of a line in hybrid combination" and specific combining ability is used to indicate "those cases in which certain combinations do relatively better or worse than would be expected on the basis of the average performance of the lines involved".

Details are given of the methods used in the estimation of general and specific combining ability. In the case of general combining ability there are indications that genes with additive effect are most important while specific combining ability is more dependent on genes with dominance and epistatic effects.

In the six single-cross tests made, the results seem to show that in its influence on yield, specific combining ability is more effective than general combining ability. The effect of these results on testing techniques is discussed.

R. M. I.

502.

ENZIE, W. D.

633.15:575.12(74.7)

Some new sweet corn varieties for New York growers.

Frm Res. N.Y. 1942 : 8 (1) : 7, 9. Abst.

[From Biol. Abst. 1942 : 16 : Sect. D : Abst. 20968].

"Information is presented on yields, days to maturity, average length of ears, number of rows of kernels per ear, and percentage of usable raw product for five yellow and six white hybrids. Allegheny, a yellow hybrid sweet corn, yielded at the rate of 7.98 tons per acre in 1941, but was inferior to Golden Cross in sweetness and flavour".

503. **Corn hybrids in Tennessee.**
Seed World 1942 : 51 : No. 5 : p. 24.
Gives the increased production in bushels per acre of the white corn hybrids produced in Tennessee by crossing on a commercial scale inbred strains of the variety Neal Paymaster.
E. K. J.
504. AVERY, G. S. (jun.),
BERGER, J. and
SHALUCHA, B. 633.15:575.125:577.17
Auxin content of maize kernels during ontogeny, from plants of varying heterotic vigor.
Amer. J. Bot. 1942 : 29 : 765-72. Abst.
Maize kernels were harvested at intervals during their ontogeny from the varieties Country Gentlemen, Golden Cross Bantam, and a number of pedigreed inbreds and hybrids; also from polyploid plants. Free and precursor auxin were extracted by a method involving alkaline hydrolysis.
No relationship was apparent between vegetative vigour of hybrids and the amount of auxin stored in the kernels produced by them.
Exploratory experiments with immature kernels of diploid and tetraploid corn also failed to reveal any evidence of a relationship between polyploidy and the amount of auxin stored in kernels.
505. ROBERTS, L. M. 633.15:576.356.2:581.143
The effects of translocation on growth in *Zea mays*.
Genetics 1942 : 27 : 584-603.
The thirteen cytologically identified translocations used in this study were produced in an inbred line of maize by pollen irradiation with 1,000 r. units. They involved all the chromosomes except chromosomes 7 and 9. One stock carried two separate translocations, two had exchanges between three chromosomes and the remainder were single reciprocal translocations. Homozygous, and in ten cases, heterozygous progenies of the 13 translocations were compared with the untreated, normal inbred in Latin Square experiments. No conspicuous phenotypical differences between translocation stocks and the normal inbred were observed. This confirms previous experience showing that position effects of the type found in *Drosophila* are not found in plants.
The translocation progenies were also compared with the normal inbred in respect of date of first shedding of pollen, date of showing the first silk, height of plant, diameter of stalk, width of leaf and length of leaf. Of a total of 138 comparisons, 49 statistical differences were found of which 43 were in the minus direction (translocation stocks being later or smaller) and 6 in the plus direction. There is no positive evidence to show that any one of these changes, considered separately, is due to a position effect. Considering all the evidence, however, the author concludes that intragenic alterations or small deficiencies would not adequately account for all the changes observed.
J. L. F.
506. KADAM, B. S. 633.15:576.356.5:575.14
Chromosome studies in relation to fertility and vigor in inbred and open-pollinated strains of autotetraploid maize.
Cornell Univ. Abstr. Thes. 1940 (1941) : 338-41.
In autotetraploid maize the range of the somatic numbers of the parent stock ($2n = 36-43$) and the frequency of such irregularities were repeated in successive generations presumably by differential functioning of eggs and pollen grains.
E. K. J.
507. SINGLETON, W. R. 633.15:581.6:575(73)
New corn hybrids. 633.15:575"793"
Canning Age 1941 : 22 : 559-60.
New sweet corn hybrids include several thought suitable for canning; the earliest of all is Carmelcross (P39 x C13), which matures 3-4 days later than Macross and 10 days before Golden Cross Bantam. The new hybrid P39 x C25 is 1-2 days earlier than Golden Cross

Bantam and has a small ear of excellent quality. Hybrid P39 x C81 is a possible rival to Golden Cross.

Among the late varieties Golden Stowell's C65 x C53 is a substitute for Greencross and stands better.

There are apparently 4 factors contributing to sweet corn quality: (1) tender pericarp, (2) sugar content, (3) colour, and (4) flavour. The last-named is the most difficult to assess and the author calls for help in this respect from the chemists.

BARLEY 633.16*

508. HERTZMAN, N. 633.16:575(48.5)
Weibulls Balderkorn. Ny förädling med högsta avkastningsförmåga och stråstyvhet. (Weibull's Balder barley. A new improved variety with the highest yield capacity and straw stiffness).
Weibulls Ill. Årsb. 1942 : 37 : 25-27.

Balder comes from the cross (Gull x an improved line of land barley) x Maja. Its special characteristics are high yield and stiff straw. In comparative tests with Kenia it showed an increase of 8%. The results of comparative tests are given showing its percentage increases over Gull, Opal B, Selecta and Freja.

Its straw length is about the same as that of Kenia and Maja. It has very stiff straw. Satisfactory results for malting quality are expected. R. M. I.

509. SMITH, L. 633.16:575.11:576.356
Cytogenetics of a factor for multiploid sporocytes in barley.
Amer. J. Bot. 1942 : 29 : 451-56.

The genetical and cytogenetical behaviour is described of mutant barley plants with the factor *mu* (multiploid sporocytes). The mutant was previously known as contabescent anther. At first metaphase of meiosis several microsporocytes may unite to form a single plate with up to 112 pairs of chromosomes. The course of meiosis and the irregularities which result from the increased numbers of chromosomes are described. Mitosis is normal, but there are certain slight morphological differences which distinguish the heterozygous *mu* plant from the normal. So far, all the pollen examined has been sterile but some seeds have been found probably due to chance pollination by a neighbouring heterozygous plant as 7 were normal and 9 *mu*. R. M. I.

510. GUSTAFSSON, Å. 633.16:575.242
Mutationsforskning och växtförädling. (Plant breeding and mutation).
Sverig. Utsädesfören. Tidskr. 1941 : 51 : 344-62.

As the result of X-ray treatment so many mutations have occurred in barley during the last three years that a detailed description would be too extensive. Only the most important types are therefore described and in particular those of practical interest. The most usual type of mutation resembles the so-called *erectum* barley with the *erectum* type of base of grain which is dominant over the Gull barley type of base. Another morphological mutation has glumes resembling the flowering glumes bearing a long bristle. The lateral florets are spiked and bristled. At least one of the two mutants known in entirely recessive in crosses with Gull barley.

In another floral mutant every outer glume bore two flowers. The plant was quite sterile. Two six-rowed mutants were found in 1940 and at least one in 1941.

Two winter barley mutants were found in 1939 but are of no practical importance as they are not winter-hardy. There are also mutations in the size and colour of the grain as well as in length and stiffness of straw. Mutations with a change of time of ripening are not uncommon. Mutant plants with a higher or lower 1,000 grain weight than the original line have occurred and variations in starch and protein content are well known.

Mutants also occur affecting the germination capacity as recorded at different times after ripening.

Details are given of experiments which show that certain mutations may out-yield the parent variety and the occurrence of mutations is discussed. R. M. I.

*See also Abst. 498.

511. GUSTAFSSON, Å. 633.16:575.243.061.633:537.531

The mutation system of the chlorophyll apparatus.

Acta Univ. Lund 1940 : 36 : No. 11 : Pp. 40.

K. Fysiogr. Sällsk. Handl. 1940 : 51 : No. 11.

The experiments were made on Gullkorn, Svalöf's Golden barley, and 8 samples of 500 seeds each were X-rayed, four samples being given 5,000 and four 10,000 r. In each set were four groups, one with 10% H₂O, one with 15% H₂O, one treated with distilled water for 23 hours to induce germination before X-raying and one in which the seeds were treated with a 0.01% solution of heteroauxin for 23 hours. Nine types of chlorophyll mutations are distinguished, albina, xantha, alboviridis, viridis, tigrina, striata, maculata, undefined mutations and plasma mutations.

Data on the effect of X-ray dosage and metabolism on sterility showed that this increases with the dosage and the physiological activity of the seeds, the degree of sterility is roughly proportional to the frequency of mutation and selection prevents a continuous increase in the rate of chlorophyll mutations, though this is less marked in the albina types.

A study of the sterility and type of chlorophyll mutation showed that induced xantha mutations do not occur in the offspring of fully fertile plants but are mostly found in the 70-90% range, viridis mutations are most common in the 30-70% range and albina mutations are distributed at random. Alboviridis mutations behave like xantha mutations and accumulate in the 70-90% range or with greatly increased sterility in the range 30-70%.

Data are also given on the relation of ear sterility and seed germination. Experiments on dosage, mutation rate and chlorophyll type show that at 5,000 r. the highest mutation rate is found in the most sterile offspring, while at 10,000 r. the rate is constant for the fully fertile plants, is increased in the 70-90% range and decreases again in the highly sterile plants (30-70%). Of the chlorophyll mutation types, albina mutations do not increase in proportion to the dose. Details are given of the relation between metabolism and induced chlorophyll mutations and the results of the investigation are very fully discussed including the bearing of the findings on the mutation concept.

R. M. I.

MILLETS AND SORGHUM 633.17

512. BENNETT, H. W. and HOGG, P. G. 633.174:575.127.2:633.282

The F₂ and F₃ generations of a sorghum x Johnson grass hybrid.

Proc. 43rd Conv. Assoc. Sth. Agric. Wrks, Memphis, Tenn. 1942 : 84-85.

Both spontaneous and artificial hybrids between diploid sorghums and the tetraploid Johnson grass (*Sorghum halepense*) were fertile. F₂ populations segregated into a complete range of intermediate types. In general F₂ plants showed a high degree of vigour; about a quarter of the population survived winter conditions. F₃ plants were on the whole more fertile and retained their hybrid vigour.

E. K. J.

513. QUINBY, J. R. and KARPER, R. E. 633.174:575.243:537.531

Inheritance of mature plant characters in sorghum induced by radiation.

J. Hered. 1942 : 33 : 323-27.

Mutants have been produced in sorghum (*Sorghum vulgare*, Pers.) by subjecting different lots of dormant seed to X-radiation. Approximately 2,000 progenies have been grown to maturity and 72 abnormalities recovered from them. The majority of them were mutants of seedling characters, but nine mature plant characters have been found. These characters, zebra stripe, midget, yellow leaf tip, fired leaf, mottled leaf, red leaf (2), freckled leaf and a dwarf, are described.

The authors suggest that all the characters are inherited as simple recessives, though there is a considerable deficiency of recessive homozygotes in several cases.

Although favourable material in which to detect a progressive mutation was X-rayed, no progressive mutations were observed.

C. M. D.

514. FIORENTINI, G. 633.174:581.6(63)
Contributo alla conoscenza delle caratteristiche chimico-tecnologiche delle cariossidi di dura dell' Africa Orientale Italiana: (**Contribution to the study of the chemical and technological characteristics of the grains of durra from Italian East Africa**).
Agricoltura Colon. 1942 : 36 : 134-39.

Studies were made of 30 samples of varying provenance and representing 6 different varieties. Marked differences between the samples were noted in respect of protein content, and to a lesser extent in content of fats and sugars; the starch content was fairly uniform.

RICE 633.18*

515. MAJIMA, I. 633.18:576.356.5:581.162.5:575-18
(**Observations on some characters of tetraploid rice plants**).
Jap. J. Genet. 1940 : 16 : 190-91.

Some autotetraploid lowland rice plants that segregated out from Shinriki x Asahi (bred by Nakamori in 1933) were described.

Comparing the $4x$ and $2x$ (Asahi) forms from the morphological and physiological standpoints it was found from observations on length in $2x$ and $4x$ plants that the nucleo-plasmic ratio was respectively 1.00 : 1.25. On the other hand their stomata showed the reverse ratio and a similar relationship was apparent in characteristics such as tillering and fruiting.

The tetraploids also developed more slowly than the diploid Asahi (a difference of 15 days in heading), but they reacted much more pronouncedly to short-day treatment which, in their case, accelerated heading by 49 days, as compared with 37 days for similarly treated $2x$ individuals. In the $4x$ plants the number of tetravalents in the pollen mother cells was mostly 10; their pollen tetrads were normal in form, but about 30% sterility was recorded.

Attempted $2x \times 4x$ and $4x \times 2x$ crosses resulted in almost all the grains set failing to continue development, success being recorded in the case of only two grains from the $2x \times 4x$ cross.

Flowering time for both $2x$ and $4x$ was regulated by the short day method.

516. TERA0, H.,
OTANI, Y.,
DOI, Y. and
TYO, Z. 633.18:581.142:581.331.23:581.036
(**Physiological studies of the rice plant with special reference to the crop failure caused by the occurrence of unseasonable low temperature. III. On the impotency of pollen and pistils under low temperature**).

Proc. Crop Sci. Soc. Japan 1940 : 12 : 196-202.

The Japanese varieties Mantaro and Rikuu No. 2 were used in this study of pollen germination on stigmas at low temperature.

The conclusion drawn is that both pollen and pistils lose their functional efficiency at low temperatures, but that this loss is much greater in the pollen than in the pistils.

517. KAKIZAKI, K. 633.18:581.162.5
633.18-2.111-1.521.6(52)
(**Varietal differences in the fertility of lowland rice in cold climate**).
Pl. Breed. News 1936 : 133-37.

In studying the reactions of 75 lowland rice varieties to different methods of cultivation, clear varietal differences were noticed in fertility under unfavourable climatic conditions, e.g. in spite of heading at almost the same time the varieties Kamen-o Nos. 5 and 1, i and Ushiwaka produced far more sterile grains than Rikuu No. 132, and similarly i and Ushiwaka were superior to Ou No. 2 and Kambara-bozu respectively.

In very unfavourable environments or years the varietal differences between early varieties were clearly seen, but with late forms they were no longer detectable owing to the general increase in sterility. When conditions were very favourable the converse result was observed. It is suggested that delaying the time of heading by abnormal conditions of cultivation may prove a useful test for the cold resistance of varieties.

*See also Abst. 442.

518. KAWANO, H. 633.18:581.45:575.11.061.6

(**Yellow leaf type in Lowland rice hybrids**).

Pl. Breed. News 1935 : p. 2171.

In annual hybridization experiments with rice at Konosu Station involving 200 varieties and over 700 combinations a yellow leaved type of plant has appeared in the progeny of combinations in which one parent was the variety Sekiyama or Bozu No. 6. In 1929 out of 120 combinations made, six showed the yellow leaf feature and in each case the segregation ratio was 15 normal : 1 yellow leaf. The varieties Sekiyama and Bozu No. 6 breed true but apparently carry a gene for yellow leaf which operates when crossing takes place.

519. MORINAGA, T. and TAJIRI, T. 633.18:581.48:575.11-185

(**The inheritance of polycaryoptic rice, with special reference to the germination structure of the lemma**).

Jap. J. Genet. 1941 : 17 : 57-62.

In 1934 one of the authors found a rice plant which displayed 46.9% sterility and whose progeny all showed a marked tendency to multiple seed formation, the average percentage of sterility being reduced to 12.7.

This mutant crossed with normal varieties produced normal caryopses. Segregation in F_2 approximated closely in some cases to 3 : 1, but in other cases marked deviations from this ratio occurred, probably owing to weakness of the mutant type.

The morphological features of the 2-seeded spikelets are described, with data on the differences observed in the germination capacity of the two caryopses.

520. KOMODA, K. and YATSUYANAGI, S. 633.18-2.111-1.521.6:578.08

(**Cold-resistant rice varieties and late sowing and plantation**).

Pl. Breed. News 1936 : 621-26.

An experiment was made with Japanese varieties of lowland rice to find out whether the ecological differences resulting from late sowing and transplanting could be utilized as a test of their cold resistance.

The results showed that among the cold resistant forms were Mantaro, Oni Shogun, and Sekiyama No. 1, the first two being least affected by a very severe winter which did serious damage to Iwate-Kameno No. 1. The reaction to the treatment revealed varietal differences; and in the later varieties a slight postponement in sowing and transplanting produced considerable delay in breeding and such varieties are, it is concluded, incapable of withstanding cold injury. A further investigation showed that the later the sowing and planting, the higher was the sterility and here again varietal differences were observed.

521. KOMODA, K. and YATSUYANAGI, S. 633.18-2.111-1.521.6:578.08

(**Darkness method as a test of cold-resistance in rice varieties**).

Pl. Breed. News 1936 : 1083-86.

A preliminary experiment with 19 Japanese varieties of rice showed that when lowland rices were screened in the field from sunlight varietal differences in the resultant delay in heading and sterility were revealed and that these differences could be utilized as a test of cold resistance in lowland varieties. Montaro and Oni Shogun were least affected by the "darkness" treatment both as regards time of heading and sterility.

(Cf. also Absts 517 and 520).

522. NAKAMORI, E. 633.18-2.484-1.521.6:575.11(52)

(**Local variations in blast-resistance in rice varieties**).

Pl. Breed. News 1936 : 823-34.

In experiments conducted for seven years by the Gifu Prefectural Agricultural Station (in Japan) it was observed that certain rice varieties are prone to blast at the main station, and less so at the sub-station, while other varieties showed exactly contrary results. The solution of this apparent anomaly (which was demonstrably not due merely to chance) has been

attacked from various aspects and external factors such as light or manuring are no longer regarded as operating in the opposite results at the two stations.

Subsequently crosses were made between two parent varieties Kyo-Asahi and Tango-Nakate representing respectively the A-type which are far more liable to blast at the main station and the B-type which is more susceptible to the disease at the sub-station.

In the F_2 a gene for time of heading and another for time of shedding of the seed were identified. From the F_3 it was possible to infer that while monofactorial segregation for resistance to blast was operating, the gene responsible was different at the main and the sub-station; hence the two genes appear to give an ordinary bi-factorial segregation and are concerned in the local variations in blast resistance.

The cause of the local variation in the functioning of the two genes has not yet been solved.

523. NAMIKAWA, N. 633.18-2.484-1.521.6:575.42:578.08(52)
("Darkness method" as a test of blast-resistance of rice. A few blast-resistant varieties of rice selected by this method).
 Pl. Breed. News 1935 : 826-29.
 SHIGEMURA, S.
(Selection of F_2 hybrids of rice in blast infested areas).
 Ibid. 1935 : p. 830.

The first paper describes the method which consists in screening the experimental plants from sunlight. Seedlings of 7 varieties and 83 strains of rice were subjected to "darkness" treatment when about 4 or 5 inches tall for 24-48 hours and then exposed to sunlight—this procedure being repeated until an attack of blast supervened. Comparative studies were also made by inoculation tests and by observation of natural infection. The results showed the "darkness" method to be simple and practical and also revealed that Shin No. 60 [= New No. 60] excels the varieties Rikuu No. 20 and Kameji No. 2 hitherto regarded as the most resistant forms.

Shin No. 60, though not yet of any particular merit as regards quality and yield, should, in point of blast resistance, prove a useful variety for hybridization.

The second paper records experiments at Niigata-ken Experiment Station demonstrating (1) the simplicity of selecting generations of lowland rice plants for blast resistance in blast infested areas instead of in normal fields; and (2) the value of the darkness method in selecting strains.

524. YOSHI, H. 633.18-2.484-1.521.6:578.08
(Studies on the nature of rice blast resistance. I. The effect of silicic acid to the resistance. II. The effect of combined use of silicic acid and nitrogenous manure to the toughness of the leaf blade of rice and its resistance to rice blast. III. Relation between rice blast resistance and some physical and chemical properties of the different portions of the leaf blade of rice).
 Bult. Sci. Fak. Terk. Kyushu Univ. 1941 : 9 : 277-91, 292-96, 297-307.

In the first paper the toughness and percentage of silica of the leaf blade of rice, grown in water to which varying amounts of silicic acid had been added, was determined to find if they were correlated with resistance to blast.

Both the resistance of the blade to blast and the percentage of silica in the blade proved to be proportional to the amount of silicic acid given. Toughness, on the other hand, did not increase in proportion to the quantity of silicic acid administered.

Part II of the investigation showed that the determination of the toughness of the leaf blade gave a good indication of the degree of blast resistance, provided the plant is grown under unfavourable conditions such as excess of nitrogen manure.

In Part III of the experiment a number of Japanese varieties of rice, susceptible and resistant to blast, were used in determining the toughness and the content of silica and of nitrogen in the tip, middle and basal portion of the leaf blades.

The author concludes that susceptibility of the rice leaf to the blast fungus is proportional to the nitrogen content of the portion of the blade, but inversely proportional to its silica content and that practically no correlation exists between resistance and degree of toughness of the leaf portion.

525. ÅKERBERG, E. 633.21:581.163
Further studies of the embryo and endosperm development in *Poa pratensis*.

Hereditas, Lund 1943 : 29 : 199-201.

"In earlier investigations (see "Plant Breeding Abstracts", Vol. XII, Abst. 1086) it was shown that apomixis is combined with pseudogamy in *Poa pratensis*. In view of this and of the results now submitted, it would seem justifiable to assume that autonomous embryo development with induced endosperm formation (fertilization most probable) is a general phenomenon in apomictic types of this species".

526. HÅKANSSON, A. 633.21:581.163:575.12
 Die Entwicklung des Embryosacks und die Befruchtung bei *Poa alpina*.
(The development of the embryo sac and fertilization in *P. alpina*).

Hereditas, Lund 1943 : 29 : 25-61.

Studies were made both of sexual forms from Switzerland and apomictic forms from Scandinavia. The sexual forms varied in chromosome number, some having $2n = 22$, others 23, 24, 25 and 31. Observations of the embryo sac development showed that all the macrospores are capable of forming an embryo sac and some plants produced more than one; the macrospores were all formed meiotically and had the haploid chromosome number.

In the two apomictic forms examined the division of the macrospore mother cell was invariably mitotic and no evidence of meiosis was ever observed. The diploid egg cell produced gave rise directly to an embryo, and the diploid chromosome number was observed in most of the embryos, though one was apparently triploid; certain instances of polyembryony are described. In both plants endosperms were formed only after fertilization of the polar nuclei had been effected (pseudogamy). The endosperm cells thus formed were pentaploid and their nuclei contained 3-5 nucleoli. The egg cell also appears to be capable, at least in some of the apomicts, of being fertilized.

The embryo starts development well before the endosperm, in contrast to the sexual forms, where the endosperm developed first. The failure of the sperm cell to effect fertilization is not the result of its incapacity to do so but of the earlier development of the egg cell, which has already divided when the pollen tube enters. When this is not so normal fertilization may sometimes occur.

One of the sexual forms was pollinated with one of the apomicts. All the progeny were sexual, but one of them gave 15% of haploids in its progeny; in fact haploids occurred in the progenies of all the seedlings with higher chromosome number.

The EMC of the hybrids divided meiotically, with the production of haploid egg cells; this together with the tendency for earlier embryo development inherited from the apomictic parent led to the production of the haploids.

527. MYERS, W. M. and HILL, H. D. 633.22:576.356.5:576.354.4
Variations in chromosomal association and behaviour during meiosis among plants from open-pollinated populations of *Dactylis glomerata*.

Bot. Gaz. 1942 : 104 : 171-77.

A full account of the results already reviewed in a preliminary report (cf. "Plant Breeding Abstracts", Vol. XI, Abst. 395).

528. MÜNTZING, A. 633.22:576.356.52:581.481
Characteristics of two haploid twins in *Dactylis glomerata*.

Hereditas, Lund 1943 : 29 : 134-40.

Two out of 198 twin plants of *Dactylis glomerata* ($2n = 28$) examined were haploids. These were less than half the dimensions of their normal diploid sister twins and showed some resemblance to *D. Aschersoniana* ($2n = 14$).

One of the haploids was completely sterile, the anthers degenerating before meiosis. Meiosis was regular in the other and 7 bivalents were formed, but no functional pollen was produced. When pollinated with pollen of *D. Aschersoniana* it produced a number of triploids and one tetraploid. Possible fertilization with *D. glomerata* pollen is indicated. E. K. J.

529. HOGG, P. G. 633.282:581.6:575.11

Breeding sorghums for low cyanide content.

Proc. 43rd Conv. Assoc. Sth. Agric. Wrks, Memphis, Tenn. 1942 : 36-37.

A considerable genetic variation in hydrocyanic acid content was observed in sorghum and Sudan grass. In crosses between plants with high and low hydrocyanic acid content, F_1 plants were intermediate and F_2 populations showed a distribution extending to the limits of the parents but not bimodal. No correlation was found between crude protein and hydrocyanic acid content of the plants. Vigorous strains of Sudan grass, uniformly low in hydrocyanic acid were developed by hybridizing inbred plants with low contents. E. K. J.

530. BURTON, G. W. 633.283:576.312.35

A cytological study of some species in the tribe Paniceae.

Amer. J. Bot. 1942 : 29 : 355-59.

Chromosome numbers of the 27 species of the *Paniceae* examined are as follows: *Panicum antidotale*, *P. arenicoloides* and *P. commutatum*, $2n = 18$; *P. anceps*, *P. sp.* P.I. 126491, *P. purpurascens*, *P. fasciculatum* and *P. paludivagum*, $2n = 36$; *P. texanum* and *P. jubiflorum*, $2n = 54$; *P. virgatum*, $2n = 72$. *Paspalum supinum*, $2n = 20$; *P. quadrifarium*, $2n = 30$; *P. intermedium*, $2n = 40$; *P. langei* and *P. longipilum*, $2n = 60$; *P. giganteum*, $2n = 120$; *P. alnum*, $2n = 24$ and *P. distichum*, $2n = 48$. *Pennisetum glaucum* (commercial) and *P. glaucum* (Russian), $2n = 14$; *P. purpureum*, $2n = 28$. *Digitaria pentzii* and *D. sp.* P.I. 111128, $2n = 36$; *D. plevansii*, $2n = 34$; *D. decumbens*, $2n = 30$ and *Axonopus affinis*, $2n = 80$.

A polyploid series is suggested by the numbers in *Panicum*, *Paspalum* and *Pennisetum*.

R. M. I.

531. JOHNSON, H. 633.285:576.356:575.127.2

Cytological studies in the genus Alopecurus.

Acta Univ. Lund 37 : No. 3.

K. Fysiogr. Sällsk. Handl. 52 : No. 3 : 3-43.

This paper deals with the cytology of 12 species of *Alopecurus*, 7 diploids ($2n = 14$), 3 tetraploids and the high polyploids *A. alpinus* ($2n = 119-122$) and *A. antarcticus* ($2n = 112-116$) and their hybrids. Amongst the features of special interest are the occurrence of syndiploidy and a case of complete asynapsis of a heritable type in *A. myosuroides* ($2n = 14$). Partial asynapsis was found in *A. pratensis* $2n = 28$ in which races with extra fragment chromosomes showed irregularities at meiosis. A single "autotriploid" with 42 chromosomes was found among the progeny of an *A. pratensis* plant with $2n = 28 + f$. Hybrids between the different species were morphologically intermediate between the parents or resembled the parent with the higher chromosome number.

Pollen sterility due to irregular meiosis was the rule in the hybrids, the only exception being the cross *A. antarcticus* ($2n = 112$) x *A. pratensis* ($2n = 28$) in which autosyndesis resulted in fairly regular meiosis and the production of some good pollen.

The taxonomic position of the species is discussed in the light of cytological findings.

E. K. J.

LEGUMINOUS FORAGE PLANTS 633.3

532. NILSSON, F. and ANDERSSON, E. 633.31:576.356.5

Polyploidi hos släktet Medicago. (Polyploidy in the genus Medicago).

Sverig. Utsädesfören. Tidskr. 1941: 51 : 363-82.

Polyploid plants of *M. sativa* were obtained by means of colchicine from three different strains, two of which were pure *sativa* and the third from the so-called Ultuna lucerne which occurred in a population from the cross *M. sativa* x *falcata*. Plants with the doubled chromosome number $2n = 64$ and with $2n = 48$, for convenience referred to as tetraploids and triploids, were obtained and are compared in detail with the original material. The tetraploids were on the whole more luxuriant and could mostly be recognized by the larger stomata and pollen grains.

Two different tetraploid types are distinguished, genotype *a*, from pure *sativa* showed increased growth compared with the diploid, while this was not the case in genotype *b* from the cross *sativa* x *falcata*. The triploids showed very luxuriant growth, and pollen fertility in both triploids and tetraploids is high, but seed setting in both is low.

R. M. I.

533. NILSSON, F. and ANDERSSON, E. 633.31:576.356.5:581.04
Polyploidy in the genus *Medicago*.

Hereditas, Lund 1943 : 29 : 197-98.

Tetraploidy induced by colchicine in *M. sativa* ($2n = 32$) produced intensification of characters in genotype A, a pure *sativa* type from Bulgaria; while genotype B derived from Ultuna lucerne was found to be weaker in tetraploid than diploid condition. Both triploids and tetraploids were obtained from crossing flowers on supposed tetraploid branches. Pollen fertility did not seem to be reduced by tetraploidy, but seed setting was weak. The triploids ($2n = 48$) showed good vitality and intensified characters in comparison with diploids. Fertility is probably reduced.

534. ZIMMERMANN, K. 633.367:581.148:551.56:575.42
 Weitere Untersuchungen zu den meteorologischen Grundlagen für die Auslese und Prüfung von Lupinen mit nichtplatzenden Hülsen (*Lupinus luteus* und *Lupinus angustifolius*). [Further investigations concerning the meteorological basis for the selection and testing of lupins with indehiscent pods (*L. luteus* and *L. angustifolius*)].
 Züchter 1942 : 14 : 165-67.

Selection for indehiscent pods can best be carried out in years with hot dry summers; data are given showing which parts of Germany are most suitable for carrying out selection.

535. ZIMMERMANN, K. 633.367:581.48
 Einige Versuche zum Problem der Hartschaligkeit bei *Lupinus angustifolius*. (Some experiments on the problem of hard seed coat in *L. angustifolius*).
 Züchter 1942 : 14 : 182-85.

Experiments are described which showed that the hardness of the seed coat is very much increased by drying in a drying chamber. Such hard seeds often require over a year of moisture treatment before they become soft enough to germinate perfectly. Observations on 10 different strains showed them to differ in the degree to which they harden when dried. No morphological or microchemical differences could be detected however even between the extreme forms. The water loss during drying was more gradual in the hard skinned forms and the differences are thought to lie probably in the pectins contained in the seed coat.

536. KLINKOWSKI, M. 633.367-2.421.1-1.521.6:575.12
 Zur Züchtung mehltresistenter Lupinen. (On breeding mildew resistant lupins).
 Wiss. Jber. Biol. Reichsanst. Land- u. Forstwirtschaft. 1940.
 Mitt. Biol. Reichsanst. 1941 : Heft 65 : p. 29.
 [From Z. PflKrankh. 1942 : 52 : p. 471].

KLINKOWSKI, M.
 Zur Kalkresistenz der Lupine. (On calcium tolerant lines of the lupin).
 Ibid 1941 : Heft 65 : p. 29.
 [From Z. PflKrankh. 1942 : 55 : p. 471].

Further crosses between mildew resistant lupins and sweet lupins have been made; previously selected resistant strains have been multiplied up as well as calcium tolerant lines.

ROOTS AND TUBERS 633.4

537. HERTZMAN, N. 633.416:575(48.5)
 Weibulls Slättbo Barres II, stam 16. Ny foderbetstam med mycket högt odlingsvärde. (Weibull's Slättbo Barres II, strain 16. A new fodder beet strain with very high cultivation value).
 Weibulls III. Årsb. 1941 : 36 : 5-7.

The new strain, derived from Slättbo, strain 76, by individual selection, has a specially high weight of dry matter. In shape and colour, the new strain resembles the mother strains. Comparative tests show its yield of dry matter to be superior to the mother strain by 4.5%.

R. M. I.

538. L....., A. 633.491:575
 Frühkartoffelzucht im Donauland. (**The breeding of early potatoes in Donauland**).
 Obst. u. Gem. 1942 : 6 : p. 227.

In this district stocks of early potatoes are grown, the diseased clones removed and destroyed and the stocks by this negative selection are improved. R. M. I.

539. KATIN-JARTSEV, L. V. 633.491:575(47)
 (**Chief results and trends of work on improved potato varieties in Western Siberia**).
 Theses and scientific papers read at the 4th District Conference of Workers of Universities and Research Institutions, Omsk 1941 : No. 1 : Agron. Sect. 60-64.

Early work on potato breeding in Western Siberia, started in 1919, consisted in clone and seed selection from existing varieties such as Early Rose, by which means considerable increases in yielding ability were achieved. Clone 1822 of Early Rose, an earlier ripener, outyielded the common form by 16.5%, and also had a slightly higher starch content.

In 1937 selection work was started with hybrids and seedlings from uncontrolled pollination; Seedling 36/15 obtained in this way was a main-crop variety with white tubers with a yellow tinge, and characterized by early tuber formation; it outyielded all others both in 1939 and 1940.

540. ARNAUTOV, V. V. 633.491:575.3
 (**Changing the nature of the potato plant by controlled nutrition**).
 Vestnik Ovoščevodstvo i Kartofel' (Vegetable and Potato Journal) 1940 : No. 1 : 6-9.

It is shown that tubers of plants grown under more favourable conditions give rise to plants with higher yielding capacity and this is thought to be a means of improving the breed.

541. MAXIMOVIČ, M. M. 633.491:575.3
 (**New methods of breeding work with potato**).
 Vestnik Ovoščevodstvo i Kartofel' (Vegetable and Potato Journal) 1940 : No. 1 : 10-14.

The great hopes attached to the use of the South American potatoes in breeding work in the U.S.S.R. have not been fully justified. One blight-resistant variety has been produced, but is inferior in quality to varieties such as Lorch. Breeders are criticized for having paid insufficient attention to the growth conditions of the seedlings and this is thought to account for the gradual loss of yield, starch content etc., of the hybrid seedlings with successive generations of tuber reproduction. Figures are given showing the great increase in yield given by plants grown from tubers obtained from summer plantings as opposed to spring plantings. Tubers of Epicure were cut in half and one half grown near Moscow and the other at Rostov; the progenies of both were grown near Moscow; that from the Moscow half gave 20% more yield than the progeny from the half grown at Rostov and had only 32% of plants affected with mosaic, as against 46% in the progeny of the Rostov half. A yield increase varying from 20 to 70% was obtained from tubers of the variety Lorch produced under conditions of high farming. Such plants were also more disease resistant.

In 1939 a first year seedling obtained by selfing the variety Sinetsvetka gave dark blue tubers when grown in peaty soil and white tubers in sandy soil. The importance of the conditions of rearing in influencing the characters of young seedlings is stressed and it is regarded as essential that seedlings for breeding purposes should be given the best possible conditions of growth, approximating as nearly as possible to the conditions under which they are to be grown in practice. The role of hybridization is in combining the potentialities of the two parents and so enlarging the scope of response to external influence. The necessity of giving individual attention to each hybrid is emphasized; also the importance of vegetative hybridization. Thus the variety Smyslovskii (Fürstenkrone) grafted on to Wohltmann caused the latter to produce white tubers altered in form, and this alteration persisted when they were reproduced. Other cases are cited where the date of maturity has been changed by grafting, and low yielding species such as *S. acaule* or *S. demissum* can be made to yield a respectable

crop of tubers in long days by grafting a domestic variety on to them. Moreover, when *S. acaule* was grafted on to Early Rose it crossed well with Fürstenkrone, giving hybrids of the domestic type which yielded up to 600 grm. of tubers per plant.

542.

LAMM, R.

633.491:576.356.5:576.16

633.491-2.111-1.521.6:575.127.2

Notes on an octoploid *Solanum punae* plant.

Hereditas, Lund 1943 : 29 : p. 193.

Unlike *Solanum tuberosum* ($2n = 48$) in which quadrivalents, trivalents and univalents are formed besides bivalents, the chromosomes of *S. punae* ($2n = 48$) form 24 bivalents at meiosis. Octoploid plants produced by colchicine treatment of this species showed remarkable vigour and fertility unlike artificially produced octoploid *S. tuberosum*. At meiosis the greater part of the chromosomes formed bivalents. About 7 quadrivalents and a few trivalents and univalents were also formed.

On the basis of its chromosome behaviour *S. punae* is considered an allotetraploid and *S. tuberosum* an autotetraploid. Crosses between octoploid *S. punae* and tetraploid *S. tuberosum* are recommended for the production of frost-resistant potatoes.

E. K. J.

543.

JOHNSTONE, F. E. (jun.)

633.491:576.356.5:581.04

633.491:575.127.2:576.356.5:581.162.5

Experimentally induced chromosome doubling in *Solanum tuberosum* L. and related tuber-bearing species.

Cornell Univ. Abstr. Thes. 1940 (1941) : 331-34.

Colchicine induced $4n$ plants of *S. bulbocastanum*, *S. chacoense* and *S. Jamesii* were vigorous, and fertile, while $4n$ plants of *S. tuberosum*, *S. andigenum* and *S. neoantipovichi* were dwarfed and sterile. All $4n$ plants had larger pollen and stomata. The amphidiploids produced by doubling the sterile F_1 *S. tuberosum* \times *S. demissum* were as sterile as their undoubled counterparts. Somatic mutations chiefly affecting chlorophyll development were found in the treated material.

E. K. J.

544.

TEDIN, O.

633.491:577.16

Fortsatta C-vitaminundersökningar på potatis. (Further vitamin C researches on potato).

Sverig. Utsädesfören. Tidskr. 1941 : 51 : 238-55.

The general results may be summarized as follows: there is slightly more ascorbic acid in the inner than in the outer part of the potato tuber but whether this is due to loss during the early part of the winter or is the normal distribution is not known.

Cooking tests show that the vitamin C content is reduced by peeling and cooking.

The results are given of tests of different varieties for vitamin C content and also of the vitamin C content of potatoes in different parts of Sweden.

R. M. I.

545.

SMITH, O.,

NASH, L. B. and

DITTMAN, A. L.

633.491:581.6

Potato quality VI. Relation of temperature and other factors to blackening of boiled potatoes.

Amer. Potato J. 1942 : 19 : 229-54.

Tubers maturing under low temperatures (50° - 60° F.) were found likely to blacken, whereas those maturing at higher temperatures (70° - 80° F.) seldom showed any discoloration. Storage at a high temperature (100° F.) for 3-4 days prevented or largely reduced blackening in lines previously susceptible.

A high hydrogen ion concentration in the tuber tissue reduces the possibility of blackening, while the black colour appears or increases in intensity in tissue of low H-ion concentration. From the results of chemical tests made, suggestions are offered on the possible mechanism involved in the production of black pigment.

Early planting or the use of earlier maturing varieties are suggested for regions where the problem of blackening is serious.

C. M. D.

546. BONDE, R.,
STEVENSON, F. J.,
CLARK, C. F. and
AKELEY, R. V. 633.491-2.3-1.521.6:575
Resistance of certain potato varieties and seedling progenies to ring rot.

Phytopathology 1942 : 32 : 813-19.

Fifty-four named varieties of potatoes and a number of seedlings were tested by control inoculation with *Phytophthora sepedonica* for resistance to ring rot.

Only two named varieties, Frisco from Holland and the British variety President and two unnamed American seedlings were found to be resistant. Degrees of resistance and susceptibility were evident in the progeny of crosses between resistant and susceptible forms.

E. K. J.

547. FEDOROVA, N. J. 633.491-2.411.4-1.521.6:575.127.2
Inoculation tests of potato for resistance to *Phytophthora*.
C.R. (Doklady) Acad. Sci. U.R.S.S. 1941 : 33 : 73-75.

Forty-eight varieties of *S. demissum* were tested for resistance to *Phytophthora* by direct inoculation of the plants at various stages of development.

In general, in the seedling stage, there was heavy infection but some strains were resistant. Various degrees of infection were shown by the tubers. The leaves of adult plants are more resistant than the tubers or the seedlings. A strain has been selected, *S. demissum* 0220/010 whose seedlings, tubers and leaves are very resistant to the fungus and which is considered homozygous in this respect.

Of 22 varieties of *S. Antipovichii* most were as susceptible as the cultivated potato. Tubers of *S. Antipovichii* f. *coloratum* D 471/122 however were only slightly affected.

R. M. I.

548. THÉNARD, J. 633.491-2.7-1.521.6:575.127.2
La lutte contre le Doryphore à l'aide de variétés de pommes de terre résistantes. (**The campaign against Colorado beetle by means of resistant potatoes**).
Rev. Hort. Paris 1942 : 28 : 135-36.

Tests have been made on 282 hybrids of *S. demissum* x *S. tuberosum* and of *S. demissum* x *S. tuberosum* x *S. andigenum*, of which 3 have proved highly resistant, 25 resistant and a number of others definitely interesting. Some resistant hybrids of good commercial type are already under examination and further crossing with domestic forms is being carried out.

549. NOVIKOV, F. A. 633.491-2.8:575.3
(Influence of external conditions on the seed qualities of potato tubers).
Vestnik Ovoščevodstvo i Kartofel' (Vegetable and Potato Journal) 1940 :
No. 1 : 24-33.

Tubers grown from spring sowings develop at higher temperatures and are ten times more active in oxidases, as well as being different in a number of other properties which are enumerated. They are more mature, ready to germinate and have a lower content of soluble carbohydrates. The plants resulting from tubers formed in the autumn (summer planting) compared with those formed in early summer (spring planting) were less subject to mosaic and the mosaic was of a less pronounced type. A similar effect, though to a less pronounced degree, was produced by covering spring sown plantings with straw to prevent the rise in temperature.

The tubers from summer plantings formed better sprouts and produced plants which flowered more profusely, died down later and gave 42-53% more yield. The degeneration produced by spring planting assumed a different form in different varieties, sometimes being expressed as mosaic symptoms alone, sometimes spindly sprouts, sometimes both.

550. ROŽALIN, L. V. 633.491-2.8:575.3
(Degeneration of the potato and the insufficiency of the theory of infection by mosaic virus diseases).
Vestnik Ovoščevodstvo i Kartofel' (Vegetable and Potato Journal) 1940 :
No. 1 : 15-23.

Experiments are described in which the familiar symptoms of crinkle were produced by

growing potatoes at higher temperatures; after several generations of such treatment the symptoms were inherited. Similarly by grafting two varieties differing in biochemical characteristics symptoms resembling mosaic were often produced on perfectly healthy plants which when grafted on to certain other varieties gave no mosaic effects at all. In other cases the same plant grafted on to one variety produced the symptoms of one virus and on another variety those of a different virus. Sap from the shoots borne by a potato tuber was found to be 1.5 to 2 times more active in oxidases than sap from the tuber itself; the former sap when inoculated into tobacco plants produced typical mottling symptoms, whilst the latter had no effect at all.

Tubers from plants grown under wide spacing gave rise to plants with a higher mosaic infection than those from closely spaced plants, and this is ascribed to the higher soil temperature resulting from the lack of shading from the leaves. Lysenko's method of summer planting is thought to be the best way of controlling mosaic diseases.

551. DUFRÉNOY, J. 633.491-2.8-1.521.6:575(73)
 La production aux Etats-Unis d'hybrides de pommes de terre résistants
 aux maladies à virus. (**The production in the U.S.A. of potato hybrids
 resistant to virus**).
 Rev. Hort. Paris 1942 : 28 : 7-8.

Reference is made to the resistance to X+Y virus in hybrids of Katahdin. This variety and others such as Chippewa, Sebago and 41956 are being used in breeding work in France by members of the Centre Nationale de la Recherche Scientifique.

552. JENKINS, J. M. (jun.) 633.491.00.14(75.7)
 633.491:575(75.7)
**The performance of certain potato varieties in South Carolina in
 1942.**

Amer. Potato J. 1942 : 19 : 213-16.

From the results of yield trials at three different stations in South Carolina it is concluded that Irish Cobbler and Katahdin are the best white-skinned varieties for this region, though Chippewa may produce quite good yields. The red-skinned variety Pontiac is the highest yielder, though inferior in some ways to Bliss Triumph. J. G. H.

FIBRES 633.5

553. YAMADA, N. 633.51:575.127.5(52)
 (**Hybridization between cultivated Asiatic and cultivated American
 cotton species. A review**).
 Jap. J. Genet. 1940 : 16 : 79-86.

The work of numerous investigators (whose experiments have already been recorded in "Plant Breeding Abstracts") is reviewed, special attention being directed to the fertility of the hybrids.

In connexion with Tanaka's findings on the use of wiring and ringing in interspecific crossing (cf. "Plant Breeding Abstracts", Vol. VIII, Abst. 547) the writer points to an instance showing that when an Asiatic species was used as the female parent, with wiring and peeling treatments, no seeds were set.

554. RENARD, K. G. 633.52:581.6:575(47)
 (**Study of the flax stem as material for breeding flax for fibre and
 producing high yields of fibre**).
 Theses and scientific papers read at the 4th District Conference of Workers
 of Universities and Research Institutions, Omsk 1941 : No. 1 : Agrôn.
 Sect. 19-25.

All flax varieties examined were heterogeneous as regards stem height, which varied from 45 to 142 cm. The transpiration coefficient was different in different varieties; the forms with longer stems appear to make the most economical use of water. Varieties differed also in the weight of their root system.

Various possible causes of degeneration in flax varieties, and methods of preventing them, are described; these include the prevention of cross-pollination and admixture and the selection of forms resistant to rust and to lodging. High yield of seed has been combined with tall stem with high fibre content.

555.

BREDEMANN, G.

633.522:581.6:575(43)

633.522-2.183-1.521.6:575

Züchtung auf Fasergehalt bei Hanf (*Cannabis sativa* L.). [Breeding for fibre content in hemp (*C. sativa* L.)].

Züchter 1942 : 14 : 201-13.

By applying selection both to the female and the male plants it has been possible to double the fibre content of the stem. The male plants are tested by cutting the stem longitudinally, removing one half for fibre estimation, and allowing only those plants with the best values to come into flower. In consequence of this, the number of male plants with less than 10% fibre was reduced from 42% in 1933 to 3% in 1941 and the number with 14-14.9% fibre raised from 3% in 1933 to 64% in 1941; at the same time the maximum fibre content was raised from under 14% to over 24%.

The female plants were all pollinated with the same élite males but the progeny from the best plants kept separate. The four races so treated have gradually approached each other in type and will in future be mixed together and dealt with as one. The average increase in fibre content from 1934 to 1941 was 70%. The female plants showed a progressive increase with each successive year, in contrast to the male plants, which showed strong increases in certain years and none in others; the increase was also more rapid in the female than the male plants; thus the number below 10% fibre fell from 30% in 1934 to 3.9% in 1936, 0.2% in 1938 and nil in 1938. In 1936 for the first time there appeared 2 plants per 1,000 with 19-19.9% fibre, in 1937 there were 72, in 1939 131 and in 1940 156; in this year there were also plants with 20 and 22% of pure fibre. The average fibre content rose from 13.1% in 1934 to 22.7% in 1941. This represents the average of 157 élite plants; among them there occurred certain plants with much higher values but the author thinks it unwise to select these alone as the high values may be partially accidental. Examples are given to illustrate how different the progenies of different high value plants may be.

Photographs are presented to illustrate the anatomical differences between the lines with high and low fibre contents. The highest fibre content found so far is 29.5% pure fibre in the females and 25.9% in the males. There seems to be no correlation between fibre and wood, so that a rise in the fibre content is not necessarily associated with a reduction of woodiness; moreover it appears that standing capacity is determined more by the character of the wood than by its quantity. Certain promising élites combining high fibre and high wood content have been earmarked for use in further breeding and in this way it is thought it will be possible to breed high fibre lines with good standing capacity.

SUGAR PLANTS 633.6*

556.

BEAUCHAMP, C. E.

633.61:575(72.95)

La variedad Mayagüez-63, caña de grandes promesas para el colono Cubano. (The variety Mayagüez 63, a cane of great promise for the Cuban colonist).

Bol. Of. Asoc. Tecn. Azucar. Cuba 1942 : 1 : 81-85.

The production of the cane in Puerto Rico from the cross P.O.J. 2725 x S.C. 12/4 made in 1928 is mentioned and a description is given of the cane, with extracts from the Puerto Rico reports. Its high yielding ability and drought resistance make it a cane of great promise for Cuba and preliminary cultivation tests have shown it to be far superior to P.O.J. 2878, Media Luna 3-17 and Mayagüez 28.

557.

YAMAZAMI, M. and

NAKAMURA, M.

633.61:575.127.5"793":633.174

(Hybrids between *Saccharum officinarum* and *Andropogon sorghum* with a view to breeding early varieties of sugar-cane).

Pl. Breed. News 1935 : 1733-38.

P.O.J. 2725 was pollinated with various Formosan and Japanese varieties of *A. sorghum* including Sato-morokoshi and Hoki-morokoshi. The hybrids included 3% albinos and 62.9% dwarfish types. The seedlings mostly resembled *S. officinarum*, though there were some intermediates and some *A. sorghum* types. The ears were of the *S. officinarum* type, with a few intermediates. Brix concentration tests showed that on the average the sugar content of the intergeneric hybrids was a little lower than that of the inter-varietal hybrids but that the

* See also Abst. 442.

former reach their peak period in November–December, thus demonstrating their earliness, as compared with the inter-variety forms which have their peak period in January–February. The intergeneric hybrids also showed some higher Brix values. It was hoped to combine this earliness with high yield, in which the above new hybrids were somewhat disappointing.

558. MORIYA, A. 633.61:576.312.35
(Preliminary note on the chromosome numbers of sugarcane varieties F108 and some others).
 Jap. J. Genet. 1941 : 17 : 62–64.

The chromosome numbers of F108, F46, P.O.J. 2725, P.O.J. 2878 and Badila are provisionally recorded as $2n = \text{ca. } 109, 122, 107, 118 \text{ and } 80$ respectively. Figures depicting the somatic chromosomes are included in the text.

559. LAURITZEN, J. I. 633.61:581.6
Testing varieties of sugarcane for resistance to inversion of sucrose and for windrowing qualities in Louisiana.
 Sug. Bull. N.O. 1942 : 20 : 210–15.

The results on commercial varieties indicate that Co. 281 stands alone in its resistance to inversion of sucrose with Co. 290, C.P.29/116 and C.P.39/120 forming a second but less resistant group. E. K. J.

560. MARTIN, J. P. 633.61–2.7:576.356.5
Stem galls of sugar-cane induced with insect extracts.
 Science 1942 : 96 : p. 39.

Stem galls have been induced on the sugar cane varieties P.O.J. 2878, H 109 and 32–8560 by injection with extract from the green leafhopper, *Draculacephala mollipes*. Studies on the chromosome number of the gall tissue are being made. R. M. I.

561. INGRAM, J. W. et al. 633.61–2.7–1.521.6(76.3)
Recent findings in the control of sugar-cane insects at the Houma Laboratory of the Bureau of Entomology and Plant Quarantine.
 Sug. Bull. N.O. 1942 : 20 : 146–48.

Canes resistant to sugar cane borer were seedlings of N.G. 251, and to sugar cane beetle, Co. 290 and C.P. 29/116. E. K. J.

562. MATHES, R. and INGRAM, J. W. 633.61–2.7–1.521.6:581.6
Development and use of sugarcane varieties resistant to the sugar-cane borer.
 J. Econ. Ent. 1942 : 35 : 638–42.

Higher percentages of joints were bored in sugar cane varieties with large stalk diameter or larger amount of pith than in those with short diameter or less pith; less injury was done by borers to varieties with high sucrose than to those with low sucrose. No relationship between borer injury and colour of stalks, width of leaf or easy stripping was observed. E. K. J.

563. MUNERATI, O. 633.63:575.182.061.634
Die Vererbung der Weissblättrigkeit bei *Beta vulgaris* L. (Inheritance of white leaves in *B. vulgaris* L.).
 Züchter 1942 : 14 : 214–15.

By cutting off the top from a white-leaved beet, new growing points developed, some producing white and some green leaves. One white and one green top were allowed to develop on the same root and in this way flowers were obtained from the white head. When these were pollinated from pigmented individuals, the progeny were all white. Pollen from the white shoots when crossed on to pigmented individuals produced all green plants, none of which produced any white forms in their progeny.

564. CARSNER, E. and TOLMAN, B. 633.63:581.143.26:578.08
Relationship of top growth to sugar beet crown temperatures and induction of flowering.
 Amer. J. Bot. 1942 : 29 : 691–92. Abst.

A report on cultural methods of modifying soil and crown temperatures, found effective in Utah in inducing seed-stalk initiation and flowering in sugar beets.

565. STOUT, M. 633.63:581.143.26:581.036.1

The relation of temperature to reproduction in sugar beets.

Amer. J. Bot. 1942 : 29 : p. 692. Abst.

Studies of bolting during storage at various temperatures showed *inter alia* that the biochemical processes associated with thermal induction of bolting are reversible and that the rate of change is greatly influenced by temperature.

566. OWEN, F. V. 633.63:581.162.51:575.11:575.182

Male sterility in sugar beets produced by complementary effects of cytoplasmic and Mendelian inheritance.

Amer. J. Bot. 1942 : 29 : p. 692. Abst.

"The nature of the inheritance of male sterility in beets indicates two types of cytoplasm. Plants with N cytoplasm produce normal and abundant pollen. Plants with S cytoplasm may produce aborted pollen and become completely male sterile. The breeding evidence indicates that several Mendelian factors may influence pollen development when carried by plants with S cytoplasm, but the same factors have no effect when carried by plants with N cytoplasm. Most of the breeding behavior is explained by assuming that two Mendelian factors, x and y , have effects complementary to the influence of the S cytoplasm as follows:

$S x x z z$ Male sterile with white, empty anthers.

$S X x z z$

$S x x Z z$

$S X X z z$

$S x x Z Z$

$S X x Z z$

$S X X Z z$

$S X x Z Z$

$S X X Z Z$

Semi-male sterile with yellow anthers but little or no viable pollen.

More or less normal pollen depending upon favorable or unfavorable environmental conditions, but the anthers sometimes fail to open.

Crosses between male sterile ($S x x z z$)♀ and normal ($N x x z z$)♂ plants produced F_1 offspring, all of which were completely male sterile. Crosses between semi-male sterile ($S X x z z$)♀ and normal ($N x x z z$)♂ plants produced F_1 offspring, approximately half of which were male sterile ($S x x z z$) and half semi-male sterile ($S X x z z$). Reciprocal combinations ($N x x z z$ ♀ x $S X x z z$ ♂) sometimes made possible by the scant production of viable pollen on $S X x z z$ plants, produced F_1 offspring, all of which bore completely normal and abundant pollen.

The unique nature of the inheritance of male sterility in sugar beets has facilitated the whole-sale emasculation of plants for hybridization purposes".

Author's summary.

STIMULANTS 633.7

567. GISQUET, P.,
DUSSEAU, A. and
HITIER, H.

633.71:575.127.2

Premier hybride stabilisé en une variété nouvelle, issu du croisement *Nicotiana Tabacum* var. *purpurea* x *N. sylvestris*. (The first hybrid stabilized into a new variety from the cross *N. Tabacum* var. *purpurea* x *N. sylvestris*).

C.R. Acad. Sci. Paris 1939 : 209 : 356-57.

The type of *N. Tabacum* used in this cross is a monosomic with the formula $23_{II} + 1$, the *silvestris* parent has a normal chromosome complement of 12_{II} . The F_1 resembled the *purpurea* parent with traces of *silvestris*. Self-pollination produced an F_2 and successive generations to F_{13} . The plants became progressively more homogeneous and more fertile. The stable type described most nearly resembles *N. Tabacum* and has $n = 24$ chromosomes.

R. M. I.

568. ROELOFSEN, P. A. 633.71:575.42(92)
633.71-2.484-1.521.6(92)

Verslag van het Deli Proefstation over het jaar 1939. (Report of the Deli Experiment Station for the year 1939).

Meded. Deli-Proefst. 1940 : 3e Serie, No. 7 : Pp. 75.

Selection work has included (a) comparison of 10 tobacco lines from various sources, and (b) another trial with the same lines to study the defect termed "loose cell".

In the first group of experiments, which was conducted by 5 different firms respectively and covered 5 different sets of trials of the 10 lines on various types of soils, one strain of the selection resistant to slime disease was always included. From the details of performance supplied from the various centres the following general conclusions are drawn:—

The line 151 DBM gave everywhere the longest leaf, being followed by $A_1 \times B_2V$ and on certain soils 161-1 DM.

As regards leaf quality Nos. 8-2-3-3 and 8-2-7 are commended as good leafy lines of a bright type, the first being suited to nearly all types of soil. Lines 161-1, DBM 1 and 151 DBM are also favourably mentioned for certain soils, but the last named which is very leafy and has very long leaves tends to become rapidly wild on the better types of soil. Line B-2 was lightest of all and ranked among the best on certain soils. The hybrid $A_1 \times B_2V$ produced a leaf resembling that of B-2, but showed too much variation, though its upper leaves are ranked high commercially owing to their fineness as compared with strains with a lower average number of leaves.

Of the R-lines, the hybrid R-1517 approached the estate strains in quality, which the uncrossed strain R-1473 did not. Both strains, under certain conditions, showed high percentages of "loose cell". The latter was recorded in one trial as very resistant to slime disease but also as producing useless tobacco.

The second group of tests comprised 10 lines tested by 4 firms at different centres for "loose cell" on alluvial soils, some older strains being included in view of the possibility that they might prove less likely to produce aberrant types with the defect. One line 161-1 (late blooming) is incidentally recorded as a selection characterized by a higher number of leaves and later blooming period than the plants of plot 161-1 from which it was obtained.

The results, though in detail apparently somewhat conflicting, when taken as a whole suggest that lines 8-2-3-3 and 8-2-7 are not specially susceptible to "loose cell": and it further appears that though the choice of a particular line may affect the percentage of this defect environmental factors play a much greater part in its incidence. It is argued that the assumption that the older strains, owing to their somewhat thicker leaf, should be less susceptible was not borne out by these experiments, in which line B-2, which is generally classed as certainly one of the fine type strains, showed relatively less susceptibility.

Investigations were conducted with 5 lines S-127, S-129, S-136, 161 DM and 8-2-3-3 DM—the first three of which had undergone prolonged selection for leaf spot [*Cercospora nicotianae*] resistance—to identify, if possible, any resistant strains. The results obtained in this experiment were, however, so contradictory and in others have been so ineffective that the work is to be abandoned. Research on the subject may be started again with an improved technique. In research on slime disease a number of lines that had undergone selection for resistance were chosen on the basis of rapid determinations on young seedlings to identify individuals likely to be resistant. The object was to estimate the merits of some of the latest hybrid and uncrossed strains among the most recent material (5th, 6th and 7th generations) obtained by type selection in strain R-12 and the most recent generations of other much younger crosses. In spite of various difficulties (disease, water supply, etc.), four of the trials were sufficiently successful to permit the following conclusions:—

There was no difference as regards the stand in the field between the control line 8-2-7 Deli Mij. and the most recent hybrid strains; but the direct offspring of R-12 all resembled that parent in some of its undesirable features, although number and shape of leaves in these was in general good.

The conclusions regarding resistance had to be based on two trials only. Apparently in general there had been an increase in the resistance of the R strains on the soil on which the experiment was made.

As regards quality (fermentation and grading) it was found that: (1) in the first two trials planted the control tobacco was superior to all R-lines; but a great difference was observed between the uncrossed R-lines and the oldest crosses on the one hand and the most recent hybrids, the latter approaching much more closely to the standard of the estate tobacco; (2) in the two trials planted last and thus containing R-lines that had undergone further selection, some of the most recent hybrid strains equalled the control in quality, the leaf of 4 of these in one of the trials being adjudged superior to the control by all breeders.

The resistance of the strains that have reached the desired standard of quality and that of their offspring to slime disease in trials in the open now remains to be tested.

The value of seed bed planting material for use in field tests of slime disease resistance is discussed.

In selection experiments it is at times important to use fresh tobacco seed and methods were therefore sought for inducing "normal" germination without the seed having to pass through the usual resting and after-ripening period. Warm water treatment proved ineffective; but sufficiently strong illumination gave good percentages of germination after 5 days—89% for young seed, as compared with 97% for old seed.

569. SYSKJAN, N. and
KOBJAKOVA, A. 633.71:581.13
(The trends of certain biochemical processes in plants during a
period of 24 hours).
Biohimija 1940 : 5 : 301-08.

During the 15th and 16th of July, 1937, throughout a period of 24 hours, variations in the nature and intensity of the action of invertase, photosynthesis, and other biochemical processes, were studied in the leaves of two varieties of *Nicotiana Tabacum*, "Maryland" and "Dubec". It was found, by means of Mursanov's method, that the synthetic action of invertase reached a maximum at 6 p.m. in the case of Dubec and at noon in the case of Maryland, and that its hydrolyzing action was most pronounced during the night.

Both oxidation and reduction by the plant tissue of Maryland and Dubec, in respect of ascorbic acid, were at a maximum during the night.

The energy of respiration (after Hagedoorn-Jensen), in the case of Maryland, was at a maximum at 12 (noon), and in the case of Dubec, at 6 p.m.

The rate of assimilation of CO₂ per unit leaf area by both varieties increased steadily from 6 a.m. until 6 p.m. I. Z.

570. MUIR, R. M. 633.71:581.162.4:577.17
Growth hormones as related to the setting and development of fruit
in *Nicotiana tabacum*.
Amer. J. Bot. 1942 : 29 : 716-20.

From direct measurements of diffusible growth hormones made on styles and ovaries of pollinated and unpollinated flowers of *Nicotiana Tabacum* it is suggested, as an explanation of the initiation of fruit development by pollination, that the pollen tubes may secrete an enzyme capable of liberating the growth hormones from inactive combinations in the style and ovary.

571. SMITH, H. H. and
SMITH, C. R. 633.71:581.6:575.127.2
Alkaloids in certain species and interspecific hybrids of *Nicotiana*.
J. Agric. Res. 1942 : 65 : 347-59.

Three different alkaloids, nicotine, nornicotine and anabasine were found in the 29 wild species of *Nicotiana* examined. The content was uniformly low, never rising above 2% and consisting of either one only or various combinations of all three alkaloids. Hybrids between *N. Tabacum* and wild species which contained chiefly nornicotine were found to contain the latter alkaloid, but in larger quantities than in the wild parent. Similar results were also obtained with anabasine-containing species.

Although *N. Tabacum* possesses a high nicotine content, the alkaloid in the most nearly related wild species is found to be nornicotine. It is suggested therefore that selection for high alkaloid content has also favoured the formation of nicotine. J. G. H.

572. HILLS, C. H. and
MCKINNEY, H. H. 633.71-2.8-1.521.6:581.6
The effect of mosaic virus infection on the protein content of susceptible and resistant strains of tobacco.
Phytopathology 1942 : 32 : 857-66.

Virus infection caused a marked increase in total nitrogen content of susceptible tobacco grown under low, medium and high nitrogen nutrition. Resistant tobacco showed a decrease with reduced nitrogen but no decrease with adequate supply. A very small amount of virus nucleoprotein was sufficient to produce measurable alterations in the metabolism of mosaic resistant tobacco. E. K. J.

573. GELIN, O. 633.75:575(48.5)
Vallmoförsök på Weibullsholm. (Poppy research at Weibullsholm).
Weibulls III. Årsb. 1942 : 37 : 31-36.

A discussion of poppy cultivation, now the most valuable oil producing plant grown in Sweden, shows that though the German variety, Mahndorfer, is most commonly grown at present, it should not be long before Swedish varieties are on the market. Comparative tests have shown that Peragis is an improvement on Mahndorfer in yield, earliness and length of stem and is a variety that has never shown any tendency to shed its seeds. R. M. I.

CONDIMENTS 633.84

574. COCHRAN, H. L. 633.842-2.112-1.521.6
Georgia pimentos.
Market Gr. J. 1942 : 71 : 289, 297.

Loss of fruit due to sun scalds in pimento was overcome by selection of a form of the variety Perfection in which the foliage was more spreading, thus providing natural shade. E. K. J.

OIL PLANTS 633.85

575. ANDERSSON, G. 633.85:575(48.5)
Oljeväxternas odling och förädling. (Cultivation and breeding of oil plants).
Sverig. Utsädesfören. Tidskr. 1941 : 51 : 256-70.

The cultivation of the oil-producing plants, linseed, poppy, rape, white mustard and soya bean, which will grow in Sweden, is briefly described. The aims of future breeding work, namely the production of plants suitable for local conditions that will produce oil to replace imports cut off by the war, are also emphasized. R. M. I.

576. GRANHALL, I. 633.853.49:575.42(48.5)
Svalöfs Regina vårraps. Ny oljeväxt för Skånes och Gotlands kraftigare jordar. (Svalöfs Regina spring rape. A new oil plant for the heavier soils of Scania and Gotland).
Sverig. Utsädesfören. Tidskr. 1941 : 51 : 341-43.

Mass selection from Danish spring rape obtained in 1940 has given Regina spring rape which in comparison with Svalöf's white mustard does not fall far behind in kg. of seed per ha. and has a higher percentage of oil, though the percentage of protein is slightly lower. Details are given for its cultivation. R. M. I.

577. McCANN, L. P. 633.854.56:581.145.1
Development of the pistillate flower and structure of the fruit of tung (Aleurites fordii).
J. Agric. Res. 1942 : 65 : 361-78.

Details are given of the development of the pistillate flowers and fruit from a number of trees taken to represent different conditions of growth and genetical types. R. M. I.

578. DOBREV, K. 633.854.78:575(49.7)
(Precautions at sunflower sowing-time).
Zemledelie, Sofia, 1941 : 45 : 53-55.

Among the varietal requirements in connexion with the sunflower crop in Bulgaria are: high yield and oil content; a high percentage of kernel and seeds that are not red; little or no branching and a relatively small proportion of leaves and stems; resistance to pests and diseases and not late maturing. The black-seeded types grown in some parts are not desirable as the colour of their oil makes refining expensive.

Experiments over a series of years at the Čirpan Agricultural Experiment Station have shown that selected strains meet most of the above requirements.

The sunflowers in Bulgaria may be grouped as (1) Russian varieties, (2) Bulgarian varieties. Among the former the well tried and widely grown variety No. 420 A, remarkable for its high yield and oil content and its resistance to pests, is of first importance for Bulgarian conditions. As compared with the Bulgarian varieties it is also more drought resistant.

Of the Bulgarian group the most widely grown are the Strains No. 3-18, 15-16, etc. of Sofia

Research Institute which are tending to replace No. 420 A and which are outstanding as regards productivity and oil content. The plants are taller than the Russian sunflower, not so late in maturing and show practically no branching. Improved varieties must not be sown near local types owing to the danger of cross-pollination.

579. ZAKHAROV, B. S. 633.854.78-2.5-1.521.6:581.035.1

Resistance of sunflower to broomrape in relation to photoperiod.

C.R. (Doklady) Acad. Sci. U.R.S.S. 1942 : 34 : 262-64.

No increase or decrease in the amount of the substance stimulating germination of broomrape seed was observed in root extractions of sunflowers grown under varying photoperiod. The increased infection generally observed during short photoperiods is probably due to the retardation of growth under reduced light and the consequent migration of nutrient substances and hormones to the root. Such a condition was artificially produced by decapitation when normally resistant sunflowers showed high infection.

E. K. J.

580. L....., A. 633.854.797

Anbauversuche mit Saflor im Donauland. Eine neue Oelpflanze. (**Cultivation experiments with safflower in Donauland. A new oil plant**).

Obst. u. Gem. 1942 : 6 : p. 264.

The cultivation of safflower, *Carthamus tinctorius*, is briefly described. Previously cultivated for its dye the seeds have an oil content of 18-30% and of crude protein about 16% before they are shelled; after shelling the oil content is 57-60% and the protein 32%. The plant is very resistant to drought.

R. M. I.

581. HARADA, M. 633.856:576.16:581.6(52)

(Quantitative investigations of the tissue of *Rhus* fruits found in Japan with special reference to their wax content).

Bult. Sci. Fak. Terk. Kyushu Univ. 1941 : 9 : 327-36.

The wax content of the fruits of various Japanese species and subspecies is discussed.

RUBBER PLANTS 633.91

582. MITCHELL, J. H.,

RICE, M. A. and

RODERICK, D. B.

633.913(75.7)

Rubber analysis of plants in South Carolina.

Science 1942 : 95 : 624-25.

A list of 34 plants growing near Clemson, South Carolina, is given, with the percentage of rubber made on a basis of air-dry weight.

R. M. I.

583. WOODWARD, C. H. and

MACDOUGAL, D. T.

633.913:575(73)

What is guayule?

J.N.Y. Bot. Gdn 1942 : 43 : 168-70.

Describes the natural habitat and methods of propagation of guayule (*Parthenium argentatum*). Domestication of this plant has been accomplished entirely by selection. The possibility of hybridization for raising the rubber yield is considered.

E. K. J.

FRUITS 634

584. FRIDSTRÖM, A. 634:575(48.5)

Sortvalet beroende av tillfälligheter? (**Variety selection based on chance?**)

Fruktodlaren 1942 : No. 4 : 106-08.

The recent severe winters have killed or injured many fruit trees and the importance of replanting with tested varieties is stressed.

R. M. I.

585. 634:575(78.3)

Thirty-ninth Annual Report of the South Dakota State Horticultural Society for the year ending June 30, 1942 to the Governor of South Dakota. Pp. 100.

Describes the activities of the State Horticultural Society and records among other things new varieties of apples, pears and other fruit trees developed in the state and the diseases recently reported.

E. K. J.

586.

JOHANSSON, E.

634:577.16:575(48.5)

635:577.16:575(48.5)

Askorbinsyrehalt hos frukt och köksväxter i färskt och torkat tillstånd.
(**The ascorbic acid content of fruits and vegetables in fresh and dried condition**).

Årsskr. Alnarps Landbr. Mej.- och TrädInst. 1940 : 1-26.

Continuing his investigations on vitamin C in fruit and vegetables, the author records here data on the ascorbic acid content of apples, pears, plums, *Sorbus*, *Sambucus*, cauliflower and numerous other vegetables. No apple variety surpassed White Winter Calville in vitamin C content but a number of hybrid apple seedlings recently obtained from crosses made at Alnarp appear very promising, some surpassing the parent forms and almost equalling White Winter Calville.

Among the pears none of the varieties, included in the investigation for the first time, surpassed Worden Seckel in vitamin C content, though one American variety, Canuga, obtained by crossing Worden Seckel and another variety, showed an equally high content.

One German variety Rudolf Göthe (a hybrid whose ancestry is discussed) attained a high level and is to be tested again.

587.

JOHANSSON, E.

634-2.111-1.521.6(48.5)

Frostskador i Svenska fruktträdgårdar vintern 1939-40. Sammanställning av rapporter från trädgårdskonsulenter och fruktdlare. (**Frost damage in Swedish orchards in the winter 1939/40 - Combined reports from horticultural advisors and from fruit growers**).

Årsskr. Alnarps Landbr. Mej. -och TrädInst. 1941 : 1-23.

The report deals *inter alia* with the classification of apples, pears and plums in Sweden by hardiness, and with environmental factors affecting hardiness, including the stocks used.

588.

PÅHLMAN, A.

634.11:001.4

Anteckningar om äpplenamnet pipping. (**Notes on the name Pippin in apples**).

Sverig. Pomol. Fören. Årsskr. 1941 : 42 : 78-87.

Researches on the origin of the name pippin.

R. M. I.

589.

HEILBORN, O.

634.11:576.356.5:575.113.7:581.162.5

634.11-2.111-1.521.6

On some effects of primary and secondary polyploidy in apples and pears.

Ann. Agric. Coll. Sweden 1941 : 9 : 116-26.

The first two sections of this paper are devoted to a discussion of the author's own results and the findings of Wanscher and of Kobel among others on relations between primary polyploidy and pollen lethals and cross-compatibility in apples and pears (cf. "Plant Breeding Abstracts", Vol. VII, Abst. 1354 and Vol. X, Abst. 211). From his own observations on pollen viability in apples and pears and also on pollen tube growth in styles after cross pollination between diploid apple varieties the author obtained figures which can be interpreted as the result of segregation between polymeric lethal genes or genes for cross-sterility. This inference is in agreement with the theory that diploid apple and pear varieties are secondary balanced polyploids and the objections of Kobel and of Wanscher are declared not to be well founded.

In the third section of the paper secondary polyploidy and cross-compatibility are discussed and the author's experimental results are cited showing that haploid pollen tubes grow more slowly in triploid than in diploid stylar tissue. This results in reduced fertility in triploid x diploid crosses as compared with diploid x diploid. On an average it may be assumed that triploidy of the style causes a delay of at least 12 hours in fertilization. Partial abortion of ovules in triploid ovaries and also the fact that triploid stylar tissue contains more incompatibility genes than diploid tissue are also factors tending to decrease fertility.

Section four deals with experiments showing that triploid apples are probably less winter-hardy than diploids—probably because, as already observed by Nebel (cf. "Plant Breeding Abstracts", Vol. VI, Abst. 246) the wood of the former matures too slowly in the autumn.

The following chromosome numbers are recorded for varieties of pears: $2n = 34$ in Augustipäron, Esperens herrepäron and Rörstrands päron; $3n = 51$ in Gråpäron and Moltke.

590. EVREINOFF, V.-A. 634.14:581.48

Les cognassiers à gros fruits. (**Quinces with large fruits**).

Rev. Hort. Paris 1942 : 28 : p. 114.

Descriptions are given of certain Central European varieties with fruits weighing up to 2 kg.

591. CHRISTOFF, A. 634.2-2.3-1.521.6(49.7)

(**Crown-gall on fruit trees in Bulgaria**).

Rev. Inst. Rech. Agron. Bulg. 1940 : 10 : 3-27.

Surveying the relevant literature the author deals with the effect of *Phytoplasma tumefaciens* on the host, the range of hosts (including those found in Bulgaria), its geographical distribution, identification, biological and physiological characteristics, and its economic significance, as well as methods of isolating and culturing the bacterium and of control and the existence of races resistant to the bacteriophage.

Having discussed the need for resistant stocks the author records his own results from inoculation of 113 lots of root stocks representing 6 species of *Prunus* with the pathogen. Considerable differences were noted in the resulting degree of tumour formation in the various stocks. After repeated tests out of a selected group consisting originally of 10 individual stocks one, No. 96 (*P. insititia*) was identified as completely resistant and another, No. 108 (*P. spinosa*) showed only two infected trees out of six.

592. HILDEBRAND, E. M. 634.2-2.8-1.521.6

Prune dwarf.

Phytopathology 1942 : 32 : 741-51.

The Damson plum (*Prunus insititia*) was found to harbour the prune dwarf virus without showing symptoms. The only essential for successful transmission to susceptible plants was tissue union between scion and stock, the shortest incubation period for prune being 5 weeks. Of the *Prunus domestica* varieties tested only Lombard plum besides the prune types developed typical foliage symptoms. None of the *P. salicina* varieties developed marked symptoms but a distinct chlorotic line pattern was prevalent in the variety Red June and Abundance. Transmission was negative from prune to cherry and positive in the case of peach. E. K. J.

593. FLORY, W. S. 634.22-2.3-1.521.6

Varietal rating of plums with reference to canker resistance.

Progr. Rep. Tex. Agric. Exp. Sta. 1941 : No. 753 : Pp. 4. (Mimeographed).

The rating of 45 plum varieties with reference to bacterial canker resistance in given. This resistance was found to be inherited in many cases. E. K. J.

594. FROST, H. B. and KRUG, C. A. 634.3:575.255:576.356.5

Diploid-tetraploid periclinal chimeras as bud variants in Citrus.

Genetics 1942 : 27 : 619-34.

A bud variant occurring on a seedling tree in a progeny from King mandarin x Dancy tangerine produced two types of vegetative progeny, one normal in growth habit, the other low and broad. Extensive investigations reported here indicate that both types are periclinal chimeras, the low broad type having the constitution $2n-4n-4n$ and the more normal type $2n-4n-2n$, in the first, second and third germ layers respectively. On this assumption—that three germ layers exist in *Citrus*—it was shown that the first layer forms the epidermis, the second all the remaining leaf tissues, the microsporocytes and at least part of the cortex of young vegetative shoots, while the third layer forms the procambium, the cambium and the pith. Roots derived from a callus on stem cuttings have their origin in the third layer, which apparently also plays an important part in determining the growth habit.

It was found that stomatal size differences, even when statistically significant, were not always evidence of differences of chromosome number in the epidermis. J. L. F.

595. JARRY-DESLOGES, R. 634.322

L'oranger? King of Siam. (**The orange(?) King of Siam**).

Rev. Hort. Paris 1942 : 28 : p. 133.

This hybrid variety, in many respects akin to the mandarin, varies very much in the quality of its fruits according to its situation.

596. KIENLE, I. 634.451:577.16
 Kaki, ein neues vitaminreiches Obst. (**Kaki, a new fruit, rich in vitamins**).
 Obst. u. Gem. 1942 : 6 : p. 269.

This fruit, which in vitamin content resembles the mandarin and in sugar content the pear, is briefly described. Pollination has a very marked effect on fruit production. A good yield is to be expected if many male flowers are produced and vice versa. The varieties vary considerably in their production of male and female flowers and the locality also affects this character. Pollination also affects the taste and colour of the fruit. Unpollinated fruits remain light-coloured and bitter. The more pollen is available, the more seeds set and the darker is the colour of the flesh. R. M. I.

597. VINSON, C. G. and CROSS, F. B. 634.451:577.16
Vitamin C content of persimmon leaves and fruits.
 Science 1942 : 96 : 430-31.

Exceptionally high contents of vitamin C were found in the leaves and fruit of both wild and cultivated persimmon. A palatable tea can be made from the dried leaves and contains a considerable amount of the vitamin. R. M. I.

NUTS 634.5

598. GERALDES, C. DE M. 634.58:581.6(67.3)
 Subsídios para o estudo das características dos amendoins de Angola.
 (Notes for the study of the characteristics of the Angola groundnuts).
 An. Inst. Sup. Agron. Lisboa 1939 : 10 : 157-65.

Data are given on size and weight of pods and of seeds and their oil content. The highest oil contents were generally found in the samples with small seeds. No correlation was observed between oil content and protein content.

599. COSTA, A. S. and SOUZA, O. F. DE 634.58-2.483-1.521.6
 Nota sobre a verrugose do amendoimzeiro. (**A note on groundnut scab**).
 O Biologico, S. Paulo 1941 : 7 : 347-49.

Several varieties were found to be resistant to the attack of *Sphaceloma arachidis* Bit. and Jenk.; a wild form, possibly belonging to a species other than *Arachis hypogaea* L. was immune and is thought promising for use in crossing.

OTHER FRUITS 634.6

600. EVREINOFF, V.-A. 634.65
 Le goumi du Japon, *Eleagnus multiflora* Thunbg. (**The gumi of Japan, *E. multiflora* Thunbg.**).
 Rev. Hort. Paris 1942 : 28 : 131-32.

The fruit, which is sour but makes excellent preserves, is recommended for wider introduction into France. *E. orientalis* L., which is less hardy, can be grown in Mediterranean zones.

601. STOREY, W. B. 634.651:577.8:575.11
A genetical interpretation of sex determination in *Carica Papaya* L.
 Cornell Univ. Abstr. Thes. 1940 (1941) : 358-60.

Factors for sex determination in *Carica Papaya* are inherited as simple Medelian units and they are allelomorphic. The female tree represents a homozygous recessive genotype, while male and hermaphrodites are enforced heterozygotes. All combinations of homozygous dominant genotypes are lethal. No heteromorphic pair of sex chromosomes was discerned. An alternative hypothesis to conform with accepted concepts of sex determination in plants is also given. E. K. J.

602. EVREINOFF, V.-A. 634.725
 Le groseillier bleu: *Ribes dikuscha* Fisch. (**The blue gooseberry, *R. dikuscha* Fisch.**).
 Rev. Hort. Paris 1942 : 28 : 46-47.

The species has the advantage of being completely resistant to fungus diseases such as *Cronartium ribicola* and of tolerating frost of as much as -45° C.

603. FERRAZ DO AMARAL, J. 634.835:575.12
 Videira híbrida com qualidades de "*Vitis vinifera*". (A hybrid vine with the qualities of *V. vinifera*).
 O Biológico, Sao Paulo 1942 : 8 : 80-82.
 FERRAZ DO AMARAL, J.
 "*Vitis vinifera*"—para vinhos brancos de tipo e gosto europeu. (*V. vinifera* for white wines of European type and flavour).
 Ibid. 1942 : 8 : 110-12.

Tests were made with Pirovano's hybrid Pignoletta in comparison with other varieties; it was adjudged a high quality wine grape and less exacting than most *vinifera* varieties under Brazilian conditions.

The second article describes observations made on a number of other European varieties. The varieties Riesling and Trebbiano were the most resistant to the local maladies.

604. 634.835:575.12:582
 634.835-2.411.4-1.521.6
 FERRAZ DO AMARAL, J.
 A videira "Golden Queen". (The vine "Golden Queen").
 O Biológico, Sao Paulo 1942 : 8 : 47-50.

The variety is said to be a hybrid between Ferdinand Lesseps and Black Alicante, themselves hybrid varieties. The extreme heterozygosity of most *Vitis vinifera* varieties is emphasized and it is pointed out that while some of the parental characters are dominant and some recessive, others present mosaics in the hybrid, which has different "genetic levels" at which the characters of the different species predominate. This may be the reason why Golden Queen is very susceptible in the leaves to attack by *Peronospora* whereas the berries are quite resistant.

605. GOLLMICK, F. and
 HILPERT, F. 634.835-2.111-1.521.6:575
 Untersuchungen über die Frosthärte der Reben und Obstgewächse.
 (Investigations on frost resistance of vines and fruit trees).
 Wiss. Jber. Biol. Reichsanst. Land- u. Forstwirtsch. 1940.
 Mitt. Biol. Reichsanst. 1941 : Heft 65 : 61-62.
 [From Z. PflKrankh. 1942 : 52 : p. 460].

Comparative observations on vines in winter 1939-40 showed that artificial freezing experiments are reliable indicators of natural resistance. The Riparia vines and their hybrids including the F_1 crosses with *Cinerea* Arnold are very resistant to frost.

The susceptibility of apples, pears and peaches to frost damage was also compared.

FORESTRY 634.9

606. 634.97:575.1(48.5)
 634.9.0015(48.5)
 Redogörelse för verksamheten vid Statens Skogsförsöksanstalt under tiden 1932-31/10 1937 jämte förslag till arbetsuppgifter under den kommande femårsperioden. (Report on the work at the State Forestry Institute during 1932-31/10 1937 with a programme for work during the coming 5 year period).
 Medd. Skogsförsöksanst. Stockh. 1938-39 (1939) : 31 : 109-62.

In order to prevent overlapping in research close collaboration between forestry experts and geneticists in the description and study of experimental trees is urged, and, in particular, with reference to the improvement of forest trees and the quality of their wood.

The problems of provenance and adaptation of seed are to be studied on an international basis. Problems of climatic races of trees and inheritance studies of their characteristic features must be included in the research on the genetics and breeding of forest and other trees, while at the same time the interrelations between environment and heredity should be widely investigated. The programme outlined by Dr H. Hesselman for the study of races by the State Forestry Institute working alongside the Association for Forest Tree Breeding includes in addition to the foregoing also work on: drought, shade and fungus and pest resistant races; characteristics affecting timber quality; environment as a factor in inheritance; selective thinning; local races; cytological, physiological and morphological studies—which (it is suggested) should be termed the "biology of inheritance in forest trees", instead of forest genetics. The Institute's work on conifers should include research on branching habit in the spruce.

607.

634.97:575.1(48.5)

HESSELMAN, H.

634.9.0015(48.5)

Den naturvetenskapliga avdelningens verksamhet under åren 1902–1938 och avdelningens framtida uppgifter. (**The activities of the natural science division during the years 1902–1938 and the future tasks of the Division**).

Medd. Skogsförsöksanst. Stockh. 1938–39 (1939) : 31 : 163–70.

In this account of the development of state forestry research in Sweden (and other countries) the investigations of Sylvén and others on problems of race and inheritance in forest trees are briefly recorded, as well as the research that was started during the period under review on climatic adaptation, cold resistance and over-wintering capacity. The necessity for certain basic genetic ecological research and for close collaboration in technical forestry problems and genetical investigations is stressed.

608.*

634.972:575(48.5)

Årsberättelse över Föreningens för växtförädling av skogsträd verksamhet under år 1941. (**Annual report on the work of the Association for Breeding of Forest Trees during 1941**).

Svensk PappTidn. 1942 : 45 : 300–07, 324–27.

SYLVÉN, N.

Föreningen för växtförädling av skogsträd. Styrelseberättelse för år 1941. (**Association for Breeding of Forest Trees—Board's report for 1941**).

Ibid 1942 : 45 : 136–38.

In spite of war difficulties in Sweden regarding staff, a considerable amount of research was successfully carried through and collaboration with various state, semi-official, commercial and other bodies (including Lund University Institute for Genetics, the Ramlösa Plant Nursery at Hülisingborg and the State Rly Department) was maintained.

Spring 1941 also saw the formation of the "Society for the Promotion of Forest Tree Improvement" (Sällskapet Skogsträdförädlingens främjande) with B. Lindquist as director and with the object of co-operating with the Association for Forest Tree Breeding. The new Society has been in the first instance concerned with pine and spruce—selection of élite trees and collection of seed from fellings of élite stands and from plantations grown from mother plants selected by Lindquist.

Research at the main Institute and the branch stations in 1941 has included the improvement of conifers, pine and Norway spruce receiving special attention.

The experiments started in 1939 (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 333) with selected nursery material of pine types were continued and some new sowings of seed from different selected mother trees or from other potentially valuable types were made at Ekebo, Dalfors, and Backe. Extensive seed collection of pine and spruce was organized and spruce plantings were made at Ekebo which, except for seed from a few pedigree specimens from Skåne, were obtained mainly from seed from Central Sweden and Norrland.

Seed from numerous selected mother trees of spruce from various parts was collected for progeny tests. In Skåne (at Knutstorp and Wrams-Gunnarstorp) a specially abundant supply of cones was obtained from over 200 mother trees mainly of the "comb"* spruce type.

"Comb" spruce seed was gathered from the Stenbackerna experimental plantation at Wrams-Gunnarstorp and also from élite trees in the high grade artificial stands at Boserup. In Halland several élite spruces were chosen as mother trees in the "German" spruce stands previously examined at Hjuleberg and other places.

The observations on growth in Southern Swedish regenerated spruces showing various types of branching have been amplified by similar observations in natural stands in Central Sweden. Analysis of the data for various districts on the basis of age classes (in which the growth increase of the different types of branching is also to be studied) indicated clearly the superiority of the "comb" spruce type as regards height and diameter at breast height.

Work on multiplication by cuttings now covers, not only spruce, but also selected mother trees of pine and larch; and the possibility is being explored of using this mode of propagation on a wide scale for desirable variants of improved types of the most important Swedish conifers.

* "Comb" spruce = Kamgran, i.e. a Norway spruce with fine drooping branches.

Hormone treatment has given successful results in the multiplication of herbaceous cuttings of birch and beech and root cuttings in aspen.

Bottle grafting too (so successful with birch) has now been tried with pine and spruce, using branches bearing flower buds of (1) Northern and Central Swedish élite pines—some narrow-crowned and some with broad crowns—and (2) élite "comb" spruces of the "German" and Swedish type and (3) for crossing with these and *inter se* also some branches from spruces with still another variation in branching habit. Though not entirely successful, these grafts provided valuable information on the proper technique which will be put into practice on a large scale in 1942. Since the appointment of a special director for research on conifers, colchicine experiments on pine and spruce and larch have been actively pursued.

Arising out of the larch survey started in 1940 a preliminary chemical study of the timber of *Larix decidua* (*europaea*), *Kurilensis*, *leptolepis* and *sibirica* has been carried out.

The hybridization work started with different types is to be continued in 1942 and bottle grafting is to be tried in these crosses.

Work on aspen and poplar is recorded as follows by H. Johnsson:—

During 1941 hybridization of aspens and of poplars continued with special attention to potentially valuable plant material. Only material from central Sweden was used in the aspen crosses. Aspens were also crossed with *Populus tremuloides* and *P. alba*, the former cross appearing particularly promising.

In the poplar crosses mainly the black and the balsam poplars were used and vigorous growing types are expected from the hybrids now being raised, *P. nigra* x *P. laurifolia* having shown specially good increment rate. From the N. American material about 10 named varieties have been produced and were transferred to Ekebo for their first tests under Swedish conditions. These varieties show remarkable growth but are probably not sufficiently hardy for the climate. In connexion with aspen improvement through polyploidy a method is being sought of inducing flowering in young high-chromosome plants: *inter alia* young aspens have been grafted in the crown of old trees in process of fruiting.

From birch seed collected in 1940 about 160,000 seedlings were raised for research in 1942 and though birch seed was scarce in 1941 collections were made in Northern and Central Sweden by the affiliated stations.

Using bottle grafting (cf. "Plant Breeding Abstracts", Vol. XII, Abst. 1210) about 50 different crosses were made, most of which gave a good yield of seed. The series included some grey birch crosses with the aim of producing a uniform grey birch race; some *Betula verrucosa* crosses with the object of obtaining a race of trees with the typical graining in their timber; and finally some species crosses made to find out whether it is possible to obtain rapid growing races as in the poplar. These crosses included the native birches, *Betula verrucosa* and *B. pubescens*, and the N. American, *B. papyrifera*, and the Asiatic species, *B. japonica*.

A small number of plot experiments specially devoted to American birches imported by Prof. G. Turesson were also laid out at various centres.

In an attempt to induce flowering and seed setting in young birches grafting of young birch plants in the crown of older individuals was tried.

Most of the 1941 beech mast was collected from various stands in Skåne, though other localities including Gullmarsberg (which is exceptionally far north for the beech) contributed part.

Some beeches of particular promise have been selected for multiplication by hormone treated herbaceous cuttings with a view primarily to seed production and high grade progeny is expected to be obtained.

Carin Eklundh gives the following report on elder, ash and elm:—

From 16 different stands in southern and central Sweden 102 lots of seedlings have been raised and are to undergo comparative trials in 1943.

The progeny of species crosses made in 1940 have shown great variation in size and habit, etc. both between and within the different lots, but it is still too early to decide whether heterosis is operating or definitely superior characteristics are present in some of the crosses.

Crosses were also made using either *Alnus glutinosa* or *A. cordata* as the female parent and *A. subcordata inter alia* as the pollen parent. The seed obtained is to be sown in the greenhouse at Ekebo.

Chromosome studies of seedlings treated with colchicine revealed mainly a simple diploid constitution, though there were a few mixoploids containing root cells with 28 and 56 chromosomes. The latter forms are to be vegetatively propagated.

A survey was made of alder stands in Halland, Västergötland, Östergötland, Södermanland and Småland and the mother trees chosen in the previous year have been more closely studied. About 50 bottle grafts of ash have been made in the greenhouse at Ekebo, using branches from mother trees from elite stands on stocks of 2-year old specimens of *Fraxinus americana* grown in pots. Unfortunately the crosses planned could not be made owing to the slow growth of the flower buds, though the vegetative buds grew rapidly. The grafts, however, gave 100% success and as many of the plants developed flower buds during the summer, species crosses are to be tried again in 1942. (See also "Plant Breeding Abstracts", Vol. XIII, Abst. 333). The second article contains a brief report on the work of the Association and its economic background during 1941.

609. KIHARA, H.
(Forest genetics).

634.972:575(52)
634.972:576.312.35

Bot. and Zool. 1938 : 6 : 220-31.

The author has been conducting experiments in forest tree breeding since 1937 and the present paper is the outcome of his preliminary survey of the literature of the main countries of the world, in which genetic and cytological research has been applied to forest trees.

Citing a list of chromosome numbers (covering two and a half pages) the writer regrets that no such determinations have yet been made for the leading forest trees of Japan, such as *Pan-lownia imperialis*, Japanese cypress, etc.

610. GRAVES, A. H. 634.972.4-2.421.9-1.521.6:575.127.2
Breeding work toward the development of a timber type of blight-resistant chestnut: report for 1941.

Amer. J. Bot. 1942 : 29 : 622-26.

In these experiments started in 1930 the ultimate aim is to combine the tall, erect habit of the American chestnut with the disease resistance of the Japanese species and thus to obtain a chestnut timber type for re-afforestation purposes to replace the American *Castanea dentata* now practically extinct as a forest tree.

Up till recently about 150 F_1 have been obtained from the cross of the above species with *C. crenata* and the tallness and susceptibility of the American species appear to be dominant, though probably each is due to a combination of several factors—an assumption supported by the fact that the F_1 hybrids are more disease resistant than their American parents.

In 1937 inter-crossing of the F_1 and back-crossing with resistant Japanese and Chinese forms was carried out and some of the resulting seedlings flowered in 1941.

A type of bridge grafting is described which can be used to keep blight infected trees vigorous enough for breeding purposes and thus avoid wastage among the susceptible F_1 trees.

Inoculation experiments showed that the Chinese species, *C. mollissima*, is highly resistant.

In view of the possibility of natural variation in disease resistance in the chestnut, a request is made for specimens of native nuts from various localities to be sent to Brooklyn Botanic Garden.

Incidentally research has been started on nut qualities, e.g. early ripening, size, flavour, ever-bearing habit, etc. of various other hybrid forms made in past years and may be continued. Somewhat similar findings are cited in a brief note on the unpublished results obtained by P. J. Anderson in crossing the Connecticut Broadleaf tobacco (which is susceptible to mosaic) with the tall, disease resistant Ambalema variety imported from S. America. All the F_1 were susceptible, but the F_2 segregation indicates that disease resistance is a "regular recessive character" and the back-crossing of desirable individuals should ultimately produce the required type.

611. LANGLET, O. 634.975:575.14(48.5)
Om utvecklingen av granar ur frö efter självbefruktning och efter fri vindpollinering. Hittills framkomna resultat av ett försök, anlagt år 1909 av fil. Dr Nils Sylvén. (On the development of spruces from seed after self-pollination and after wind pollination—Results to date of an experiment, instituted in 1909 by Dr N. Sylvén).
Medd. Skogsförsöksanst. Stockh. 1940 : 32 : 1-22.

The plant material and methods used have already been described by Sylvén (1910) and are

briefly recapitulated here with reference to the pollination of the 5 original mother trees, one of which failed to produce cones that developed.

From the 4 other trees 162 cones were obtained by isolation and artificial selfing.

Seed from the isolated cones showed a considerably lower germination percentage than from those not isolated, except for tree No. 3 in which the germination percentage was 118 and the seed weight greater than in the case of the wind pollinated trees.

The effects of inbreeding were manifested by the death of 25% of the plants from the isolated seed (in contrast to the non-isolated group which survived entire) and by their relatively poor growth (only 48% of the normal group.)

How far the height differences between the different progeny groups might be due to internal or external factors is discussed, as well as anomalies in the position of the needles and the type of branching found in inbred spruces. The findings of other workers on different species of trees are also considered, and also the difficulties of determining from the present comparative experiment the respective roles played by differences in genetic constitution and in the degree of degeneration due to inbreeding as factors responsible for differences in the development of selfed trees. The diallel method of crossing alone could provide a definite solution to this problem (cf. "Plant Breeding Abstracts", Vol. IX, Abst. 865).

In discussing the importance of a technique that would enable a comparison to be made between mother tree and progeny as regards characters that can be more precisely estimated, some data from an experiment on growth increase are cited as suggesting that growth rate in the spruce may be hereditary.

Further research on lines which would eliminate environmental influences is called for on the possible inheritance of needle type, in view of the differences between this feature in one of the mother trees and its progeny.

Extensive measurements and other observations would need to be made to determine the inheritance of type of branching and of needles as well as of the cone scales. In the author's opinion branching habit would appear to be conditioned by several genetic factors.

A bibliography is appended dealing with earlier work on the subject and with relevant results obtained for other species of trees.

VEGETABLES 635

612. FRIDSTRÖM, A. 635(48.5)
Odlingsvärda köksväxter. (**Vegetable varieties worth cultivating**).
Fruktodlaren 1942: No. 1: 10-13.

The use of tested and controlled seeds is urged and the names are given of good varieties of beans, peas, spinach, lettuce, carrots, beetroots, onions, leeks, tomatoes, cabbages, sprouts and cauliflowers. R. M. I.

613. LAMM, R., 635:575.1(48.5)
LENANDER, S. E. and 635.0014:631.521.5(48.5)
HYLMÖ, B.
Sort- och stamförsök med köksväxter vid Alnarp 1937-1940. (**Variety and strain trials with vegetables at Alnarp 1937-40**).
Årssk. Alnarps Landbr. Mej.- och TradInst. 1941: 3-80.

Another annual report on the performance of different varieties and strains of vegetables (cf. Abst. 614). The new method of presentation is explained and an English key is provided for those who wish to study the tables.

Among the research mentioned as in progress during 1940 (though no details are given of results obtained) are: improvement of beans, parsnips, sugar peas and Brussels sprouts; genetic analysis of pea crosses; species crosses of *Lactuca* and genetic and physiological investigations of sex in spinach.

In the analysis of the data mention is made *inter alia* of disease resistance in celeriac and in lettuce and of some improved types of lettuce obtained from Kunger av Denmark [King of Denmark] and crinkly leaved varieties.

614. LAMM, R. and 635.0014:631.521.5(48.5)
LENANDER, S. E. 635:575(48.5)
Redogörelse för stamförsök och statskontroll av köksväxtstammar vid Statens trädgårdsförsök år 1939. (**Report on trials of strains and state**

control of vegetable strains in the State horticultural experiments, 1939).

Årsskr. Alnarps Landbr. Mej.- och TrädInst. 1940 : 1-92.

NYHLÉN, Å.

635.0014(48.5)

Odlingsresultat från lokala försök med köksväxter under åren 1936-1937. (**Results of local cultivation trials with vegetables during 1936-37**).

Ibid 1940 : 1-47.

LAMM, R. and

NYHLÉN, Å.

Sammanfattning av sort- och stamförsök med köksväxter ur Statens trädgårdsförsöks meddelanden av år 1940. (**Summary of variety and strain trials with vegetables from the report of the State horticultural experiments of the year 1940**).

Ibid 1940 : 93-114.

In the first of the above reports the results of continuous trials of varieties and strains of vegetables conducted at Alnarp are presented and include the results of field control of vegetable seeds carried out on behalf of the Swedish State Seed Testing Station.

Owners of promising strains can participate in the official variety trials at Alnarp, and if after a 2-year test, in which the standards as regards yield, earliness, quality, disease resistance and purity are very high, their entries are found satisfactory, the strains are adjudged "a first class strain". This testing process is repeated in 5 years and, according to their performance, the strains may retain their category or may be disqualified.

The statistical basis of the experiments and the standards set and methods used are explained. Improvement work with peas, beans and lettuce was conducted on a minor scale: a strain of edible podded, marrow-fat pea bred at the Institute was for sale as Alnarps Artemis/39.

The second report on trials in various localities in Sweden of all types of vegetables gives information on the best varieties and strains and their suitability for Swedish conditions.

German and English equivalents and synonyms are given in many cases.

The third report compares the work recorded in (1) and (2) above discussing in further detail the performance of the varieties tested respectively at Alnarp and at the numerous local centres.

615. SVENSSON, V.

635.13(48.5)

Morotsodlingen. Betydelsen av förstklassiga stammar och av rationell drift. (**Carrot cultivation. The importance of first class strains and sound management**).

Weibulls III. Årsb. 1942 : 37 : 36-41.

A list of varieties and the conditions for which they are best suited.

R. M. I.

616. KULLANDER, S.

635.13:577.16:575(48.5)

Undersökningar över karotinhalten hos morötter och brännässlor jämte några observationer över karotinets hållbarhet. (**Investigations on the carotin content in carrots and nettles with some observations on the keeping property of the carotin**).

Årsskr. Alnarps Landbr. Mej.-och TrädInst. 1941 : 1-11.

In testing varieties and strains of carrots for their value as a source of vitamin A, it was found that depth of colour of the flesh was correlated with carotin content; but this did not hold for carrots of the fodder type Gul Jätte and Super Vit-Jätte. Carrots with a high carotin content at harvest showed loss of carotin during winter storage, whereas varieties with a carotin content below 0.100 mg. β carotin per gramme showed relatively little loss.

Urtica dioica showed a high carotin content, 0.188 mg. β carotin per gramme of fresh leaf.

617.

635.24:575.127.5:633.854.78

Eine neue Kartoffelfrucht in Böhmen. (**A new potato fruit in Bohemia**).

Obst. u. Gem. 1942 : 6 : p. 223.

Salsifis ameliora, from the cross between the Jerusalem artichoke and the giant sunflower produces 100-200 tubers per plant. The tubers contain starch and a large quantity of vitamin C.

R. M. I.

618. COULTER, F. C. 635.25:576.16(56 + 54.2)
The story of garden vegetables. XI: Onion, valued from time immemorial.

Seed World 1942 : 52 : No. 4 : 30-31, 35.

The original home of the onion is traced to the region between Turkey and N.W. India. An account of its ancient cultivation and varieties is given. E. K. J.

619. NICHOLS, C. (jun.) 635.25:576.356:537.531
The effects of age and irradiation on chromosomal aberrations in *Allium* seed.

Amer. J. Bot. 1942 : 29 : 755-59. Abst.

"Chromosomal aberrations appearing in the primary divisions of root tip cells in several varieties of *Allium* have been analysed. Ageing of the seed was found to result in an increase in the number of aberrant cells. Irradiation of the dry seed also causes an increase in the number of aberrations. No correlation was found between the age of the seed and its radio-sensitivity, indicating that possibly two different mechanisms may be involved.

Delayed germination of seeds following irradiation causes a significant increase in the number of aberrations except in cases where fresh seed is used. The number of aberrations is also found to be greater when the moisture content of the seeds is increased during the period of delayed germination.

In addition to the aberrations arising as the result of "direct hits" following irradiations, it is pointed out that physiological factors such as age of seed and moisture content are of importance in bringing about structural changes in the chromosomes." Author's summary.

620. KRICKL, M. 635.34:581.6:575.42
Züchtungsversuche zur Beeinflussung der Kopfbildung bei Kopfkohlarten. (Breeding experiments on influencing head formation in species of headed cabbage).

Züchter 1942 : 14 : 185-96.

The size of the stalk in the centre of a cabbage head is an important factor in determining quality and experiments are described which show that it can be materially reduced by breeding; forms with hardly any stalk in the middle of the head have been produced, without any attendant diminution in the number of leaves. A general consideration of the results leads to the conclusion that the stalk portion should amount to not more than 30% and not less than 25% of the total height of the head; the stalk should always be triangular in form, with a broad base, since this has been found to be associated with a reduced tendency towards bursting and with the best form of head. An example is given of selection from the progeny of a red cabbage of very poor head type, in the third generation of which an excellent type with compact head and small conical stalk was produced. A further reduction of the relative stalk length was expected in the later generations, and the best F_3 plants were reproduced by cuttings and some of them bagged. The bagged plants gave almost as much seed as unbagged plants. Similar improvements were attained by selection in Savoy cabbage.

621. MUNGER, H. M. 635.61:575.125
Breeding muskmelons, with special reference to the possible utilization of first generation hybrids.

Cornell Univ. Abstr. Thes. 1941 (1942) : 350-53.

Describes methods of hand pollinations in musk-melons. In general F_1 hybrids tested were superior to either parents in yield of fruit, flesh and sugar, in quality and earliness. The production of hybrid seed for commercial planting is recommended. E. K. J.

622. COULTER, F. C. 635.61:576.16:631.524
The story of garden vegetables. X: Musk melon: the ancient records are obscure.

Seed World 1942 : 52 : No. 2 : 12-13.

Discusses the reference to melons in ancient literature and traces its introduction and cultivation in Europe and America.

E. K. J.

623. PRYOR, D. E. 635.61-2.421.1-1.521.6:577.16
The influence of vitamin B₁ on the development of cantaloupe powdery mildew.
 Phytopathology 1942 : 32 : 885-95.
 Vitamin B₁ (thiamin hydrochloride solution), when added in various concentrations to the soil, increased the powdery mildew colonies (*Erysiphe cichoracearum*) on the susceptible variety and necrosis on the resistant. E. K. J.
624. BRAUM, A. E. 635.615-2.484-1.521.6:581.192
Resistance of watermelon to the wilt disease.
 Amer. J. Bot. 1942 : 29 : 683-84.
 Biochemical studies were made of the very susceptible Kleckley Sweet (not the improved Kleckley Sweet), and the less susceptible Citron in which the rate of growth of *Fusarium oxysporum* f. *niveum* is very slow. The Citron variety contained more acetic acid as compared with Kleckley Sweet, but further experiments will be needed to prove definitely that the acetic acid content is the basis of wilt resistance.
625. SHIFRIS, O. 635.63:576.356.5:581.04
Artificially induced polyploids in the genus *Cucumis*.
 Cornell Univ. Abstr. Thes. 1941 (1942) : 363-65.
 See "Plant Breeding Abstracts", Vol. XIII, Abst. 353.
626. HEINZE. 635.63-2.8-1.521.6
 Prüfung von Gurkensorten auf ihre Resistenz gegen das Gurkenmosaik-virus Nr. 1. (**Testing cucumber varieties for their resistance to cucumber mosaic virus No. 1**).
 Wiss. Jber. Biol. Reichsanst. Land- u. Forstwirtschaft. 1940.
 Mitt. Biol. Reichsanst. 1941 : Heft. 65 : p. 23.
 [From Z. PflKrankh. 1942 : 52 : p. 461].
 From field experiments it appears that "Sensation" (a variety produced by the Terra Co.) must be classed among those with increased resistance to the virus.
627. SHIFRIS, O.,
 MYERS, C. H. and
 CHUPP, C. 635.63-2.8-1.521.6:575.11
Resistance to mosaic virus in the cucumber.
 Phytopathology 1942 : 32 : 773-84.
 Resistance to virus symptoms in the cucumber was found to be due to three complementary genes which apparently controlled the production of chlorosis at the cotyledonary stage. The genetical ratio in F₂ seedlings was 27 non-chlorotic to 37 chlorotic.
 After this stage one or more gene modifiers were found to take part in the genetical control of virus symptoms and the frequency of symptomless plants was very low.
 The paper gives practical suggestions to cucumber breeders about inoculation methods for testing mosaic resistance. E. K. J.
628. LESLEY, J. W. and
 LESLEY, M. M. 635.64:575.061.633
A hereditary variegation in tomatoes.
 Genetics 1942 : 27 : 550-60.
 A type of variegation in tomatoes is described in detail, in which pale-green areas occur in a very irregular pattern and to a very variable extent. The variegation also produces histological and morphological changes and in severe cases may lead to sterility. It is not transmitted by the methods effective with viruses and is inherited maternally. Cases in which an apparently normal seed parent produced variegated offspring are probably to be explained by very weak expression of variegation in the parent.
 It is suggested that the absence of anthocyanin in the pale-green areas is due to the absence of chloroplasts. J. L. F.

629.

POWERS, L.

635.64:575.127.2:519.24

635.64:581.47:575.183

The nature of the series of environmental variances and the estimation of the genetic variances and the geometric means in crosses involving species of *Lycopersicon*.

Genetics 1942 : 27 : 561-75.

The cross studied was Danmark (*L. esculentum* Mill.) x Red Currant [*L. pimpinellifolium* (Jusl.) Mill.]. The experiment was laid out in randomized blocks, the "treatments" being the two parents, the F_1 , the F_2 and the back-crosses to Red Currant and Danmark. The character studied was individual fruit weight, taken in grams and transformed to logarithms throughout. A theoretical curve was constructed showing the percentage of the genetic variance included in the "between means of blocks" variance for a given number of individuals per block. In the present experiment this percentage was negligible.

In the parents and the F_1 the genetic variance is at a minimum and from the variances for these "treatments" it is shown that the environmental variance is directly proportional to the mean. Using the relationship thus established the environmental variances for the F_2 and back-cross generations were calculated and then, by subtraction from the treatment variances, the genetic variances were determined. Since the genetic variance of the back-cross to Red Currant was less than that of the back-cross to Danmark, it is concluded that genic dominance is present.

Formulae derived by Wright, assuming that the effects of different genes are geometrically cumulative, for the prediction of means of segregating generations (F_2 and back-crosses) from those of the parents and F_1 , are shown to be valid irrespective of genic dominance (intra-allelomorph interactions) and of linkage. The means of the F_2 and back-cross generations calculated according to these formulae were compared with the means actually obtained. It was found that the predicted means were in all three cases slightly too high and in the case of the F_2 the difference was more than three times its standard error. Hence the effects of the genes may not be strictly geometrically cumulative, but the discrepancies are small and the multiplicative hypothesis gives a much closer fit than the arithmetic. J. L. F.

630.

ALEXANDER, L. J.

635.64-2.484:576.16:631.521.6

A new strain of the tomato leaf-mould fungus (*Cladosporium fulvum*).

Phytopathology 1942 : 32 : 901-04.

The variety of tomato "Globelle" introduced as resistant to leaf mould proved susceptible to a new physiological strain of the fungus. E. K. J.

631.

ANDRUS, C. F.,

REYNARD, G. B. and

WADE, B. L.

635.64-2.484-1.521.6

Relative resistance of tomato varieties, selections, and crosses to defoliation by *Alternaria* and *Stemphylium*.

Circ. U.S. Dep. Agric. 1942 : No. 652 : Pp. 23.

The most outstanding resistance to grey leaf spot (*Stemphylium*) was found in lines of *Lycopersicon pimpinellifolium* and hybrids involving this tomato as a parent.

Many selections resistant to grey spot were also resistant to fusarium wilt. No significant correlation existed between resistance to *Stemphylium* and resistance to *Alternaria*. E. K. J.

632.

ANDRUS, C. F.,

REYNARD, G. B.,

JORGENSEN, H. and

EADES, J.

635.64-2.484-1.521.6

Collar rot resistance in tomatoes.

J. Agric. Res. 1942 : 65 : 339-46.

Four-week-old tomato seedlings of some 150 different varieties when tested for resistance to collar rot (*Alternaria solani*) by dipping into a suspension of the macerated fungus culture showed a range of infection from complete susceptibility to a high degree of resistance.

It is recommended that such resistant varieties as Riverside, Norduke or Prairiana could be used by growers in place of the more susceptible types at present grown. The results indicate moreover that selection and breeding amongst the more desirable varieties with moderate resistance would be of great advantage. J. G. H.

633. LAMPRECHT, H. 635.65:575(48.5)
 Aktuella uppgifter vid förädlingen av bönor och ärter. (**Current tasks in breeding beans and peas**).
 Weibulls III. Årsb. 1941 : 36 : 33-38.

Aims in breeding beans include earliness, disease and cold resistance, high yield and high protein content of the seed. Crosses of peas have resulted in two new varieties, Apollo and Olympia.

Experiments are also in progress to produce a stringless type of pea pod.

R. M. I.

634. PINCKARD, J. A. 635.65-2.6-1.521.6
Root-knot.

Circ. Miss. Agric. Exp. Sta. 1942 : No. 104 : Pp. 4.

Describes the symptoms of root knot caused by the eelworm *Heterodera marioni*. The varieties of peas and beans resistant and susceptible to root knot are listed.

E. K. J.

635. TSCHERMAK-SEYSENEGG, E. VON 635.652:575.127.2
 Über Bastarde zwischen Fiséle (*Phaseolus vulgaris* L.) und Feuerbohne (*Phaseolus multiflorus* Lam.) und ihre eventuelle praktische Verwertbarkeit. [**Hybrids between French bean (*P. vulgaris* L.) and scarlet runner (*P. multiflorus* Lam.) and their possible practical utilization**].
 Züchter 1942 : 14 : 153-64.

Spontaneous hybrids between the two species have been occasionally observed. The author still regards his own method of artificial cross-pollination as the best and the method is again described. The F_1 *P. vulgaris* x *P. multiflorus* hybrids, though intermediate in many respects show a strong resemblance to *P. multiflorus*; the reciprocal cross is very rarely successful, but when it is produced resembles the direct hybrids; the thickened, tuberous roots were found to be too woody and tasteless to be recommended for human consumption, or even for stock feed. Complete segregation of specific characters was observed in F_2 , the forms with thickened roots being invariably *P. multiflorus* types in floral, and other characters. Correlations were also observed between colour of the flower and the seed. No absolutely stringless *multiflorus* form has been found, though forms with reduced stringiness did occur among the segregates. The size of the *multiflorus* parent was at first not recovered in the F_2 , but after repeated selection forms fully equal to the parent were attained.

The author compares his segregations with those reported by Lamprecht (see "Plant Breeding Abstracts", Vol. XI, Abst. 1139).

A wider use of *P. multiflorus* as a vegetable is recommended for Central Europe.

636. DANIEL, L. 635.652:575.183
 L'hérédité chez le haricot xénié. (**Paternal inheritance in the haricot bean**).
 C.R. Acad. Sci. Paris 1939 : 209 : 389-92.

A cross is reported between the climbing bean, Princesse and the dwarf green bean, Flageolet. The F_1 progeny all resembled the male dwarf parent but in later generations characters of the maternal parent were noticed and are described. In the author's opinion, this throws doubt on the validity of the mendelian hypothesis.

R. M. I.

637. POPESCO, C. 635.652:575.3:581.165.71
 Obtenition par greffe d'une race tardive et vivace de Haricot de Soissons. (**A late and perennial race of the bean Haricot de Soissons obtained by grafting**).
 C.R. Acad. Sci. Paris 1940 : 210 : 446-47.

Desmodium canadense (perennial) grafted on to the annual *Phaseolus vulgaris* retarded the development of the stock. In the autumn the plants were cut back and wintered in a cold greenhouse. Growth was resumed in the spring. The process continued for several years. The characters for lateness and perennial growth were inherited. The main roots of the plants grown from the seed of the grafted plants were tap roots and rich in starch. This, according to the author, constitutes an example of acquired inheritance as the result of grafting.

R. M. I.

638. DANIEL, L. 635.652:575.3.061.6
 Sur les variations de la couleur des gousses et des graines des haricots.
 (On the variations of the colour of the pods and seeds of haricot
 beans).

C.R. Acad. Sci. Paris 1939 : 209 : 499-501.

Notes on the variation in colour induced by excessive rain and, according to the author,
 reproduced in following generations. R. M. I.

639. LACKEY, C. F. 635.652-2.8:576.16:631.521.6
 Relative concentrations of two strains of curly-top virus in tissues
 of susceptible and resistant beans.

Phytopathology 1942 : 32 : 910-12.

Infection percentages in beets were greater when inoculations for curly-top virus were taken
 from a susceptible than from a resistant variety of bean (*Phaseolus vulgaris*). E. K. J.

640. COSTA, A. S. and FORSTER, R. 635.652-2.8-1.521.6:575(81)
 Duas molestias de virus do feijoeiro (*Phaseolus vulgaris* L.). (Two virus
 diseases of the bean *P. vulgaris* L.).
 O Biologico, S. Paulo 1941 : 7 : 177-82.

Observations carried out by the Department of Genetics showed the variety Bico de Ouro
 (Golden Beak) to be resistant to common mosaic.

641. ANDERSSON, G. 635.655:575(48.5)
 Redogörelse för arbetena med soja vid Sveriges Utsädesförening åren
 1938-1940. (Report on the work with soya beans by the Swedish
 Seed Association for the years 1938-1940).
 Sverig. Utsädesfören. Tidskr. 1941 : 51 : 94-122.

Beginning with a short account of the history of the soya bean, the report continues with a
 description of the various types. The breeding of a type suitable for cultivation in Sweden is
 being considered. It must be early, of high yield and quality, and must not require excessive
 light or heat and must have a type of growth suitable for easy harvesting. Selection, crossing,
 treatment with colchicine and X-rays are being used to produce the desired results. The
 three years which have already been spent on the research represents too short a time for any
 definite results but certain lines have been selected which show promise. R. M. I.

642. 635.655:575(77.7)
 Soybeans for farm gardens.
 Soybean Digest 1942 : 2 : No. 4 : 11-12.

Describes the agricultural and other qualities of three varieties of soya beans selected as
 suitable to be grown as a green vegetable under Iowa conditions by Dr Weiss and Prof. Wilsie
 of the State College, Iowa. These are "Sac", "Kanro" and "Jogun". When planted at the
 same time these three varieties provide a succession of green vegetable beans throughout the
 late summer. E. K. J.

643. COULTER, F. C. 635.656:575
 The story of garden vegetables. XII, Peas: cultivated from the
 stone age onward.
 Seed World 1942 : 52 : No. 8 : 14-15, 30.

The discovery of peas in prehistoric sites of human habitation provides evidence of their use
 by man from stone age onwards.

South-west Asia and Abyssinia are indicated as places of origin of the small seeded and other
 varieties of peas.

Peas took the place of potatoes in mediaeval days and at least 3 varieties, Rouncival, Hastings
 and Marrowfat were known in the 16th century.

The improvement of the garden pea by hybridization began with T. A. Knight in the 18th
 century, followed by the work of MacLean and Laxton, whose breeding work paved the way
 for the many new strains now in cultivation. E. K. J.

644. TORSELL, R. 635.656:575(48.5)
 Svalöfs Malmärt (Vrm 01020). Ny foderärtsort för Värmland, Dalarne
 och angränsande områden av Svealand och Norrland. [**Svalöfs Malm
 pea (Vrm 01020). A new forage pea variety for Värmland, Dalarne
 and neighbouring districts of Svealand and Norrland**].
 Sverig. Utsädesfören. Tidskr. 1941 : 51 : 71-82.

The results are recorded of trials with a new variety of pea, named Svalöfs Malm, a selection from local strains of small seeded, grey *Pisum arvense* L. grown in Dalarne and Norrland. The new variety outyielded the mother strain, Born, by 4-10% and surpassed Bottnia by 15-30%. The difference in yield of Malm was less marked. Malm is an early variety, ripening one or two days earlier than the parent variety. It has reddish violet flowers. In number of internodes below the first flower it is intermediate between Solo and Born. It has relatively fine stalks. The 1,000 grain weight is about 95 gm. The seeds are greenish grey with dark blue markings. Although it ripens only a few days earlier than Solo, on account of its small seeds it ripens better and can be grown further north. R. M. I.

645. SCHROEDER, W. T. and 635.656-2.484-1.521.6
 WALKER, J. C.
**Influence of controlled environment and nutrition on the resistance
 of garden pea to fusarium wilt.**
 J. Agric. Res. 1942 : 65 : 221-48.

In peas resistance to fusarium wilt is inherited as a dominant Mendelian character. The severity of the disease in susceptible plants was found to be directly proportional to the sand temperature and to a lesser extent on the concentration of the nutrient solution used. E. K. J.

646. CARPENTER, C. C. and 635.8:577.16
 FRIEDLANDER, E. W.
Occurrence of vitamins in fungi.
 Science 1942 : 95 : p. 625.

The production of thiamin, vitamin B₁ and riboflavin, B₂ have been found by the authors to occur not only in *Aspergillus niger* but also in such species of the higher fungi as *Agaricus campestris*, *Pezzia badia* in the *Glaucus* group of *Aspergillus*, species of *Penicillium* and some *Fusaria*. R. M. I.

BOOK REVIEWS

SCHUMACHER, F. X. and

CHAPMAN, R. A.

519.24:634.9

Sampling methods in forestry and range management.

Bull. Duke Univ. Sch. For. Durham, N.C. 1942 : No. 7 : unbound \$2.00, bound \$2.50. Pp. 213. 26 figs. tables.

This bulletin is a sign of the increasing extent to which statistical methods for the collection and accurate mathematical analysis of data are taking their due and proper place in the business of forestry. The bulletin is concerned, as the title indicates, with the estimation of quantities by means of samples. Foresters have, of course, been doing this ever since forestry has been conducted for modern business purposes. The difference between the methods described by the authors and those commonly used in the past for estimating such quantities as volume of timber standing or area of land occupied by different forest types, is that the more modern methods, being based on the mathematical theory of probability, permit of the determination of the error inevitably involved in the estimate of such quantities and also of the best estimate obtainable consistent with the time and money available for the work. Thus, so far as the estimate of these quantities is concerned, one is enabled to determine the probable degree of accuracy with which one is working.

The bulletin is divided into three parts. Part I gives the necessary background of statistical theory. This is done in an elementary but adequate manner and is necessarily more or less a repetition of what has been given previously in other works. Part II is concerned with direct estimates by sampling. The examples given are concerned with the sampling of an area in order to obtain a quantitative estimate of some characteristic, such as the area under grass or forest, or the volume of timber in different forest types within the area. These are methods eminently suited to forest survey work and should be of considerable interest to those dealing with it. Simple and stratified or representative random sampling is dealt with; also the sampling of regular and irregular areas and the problem of simultaneously sampling more than one population. Part III is devoted to indirect estimates through regression. The methods described here are concerned with those cases in which the quantity to be estimated, say volume of timber, is dependent mainly on two related characteristics, e.g. height of tree and sectional area of stem. If it can be shown that height, the characteristic most difficult and expensive to measure, varies in a consistent manner with the diameter of the stem at breast height, it is possible very largely to reduce the labour in sampling and at the same time to arrive at an adequately correct estimate.

The last chapter contains some very pertinent and useful remarks on some of the practical aspects of sampling and may be recommended to all concerned. The bulletin finishes with an Appendix in which the mathematical derivation is given of some of the quantities referred to in the text.

551.56:63

Climate and man.

Yearb. U.S. Dep. Agric., Washington, D.C. 1941 : \$1.75. Pp. xii + 1248. figs. tables. maps.

The invaluable series of yearbooks of agriculture produced by the United States Department of Agriculture was continued in 1941 by "Climate and Man", of which it can be said at once that it maintains the high standard set by its predecessors. Like them, it takes the form of a symposium of expert articles which can be read by the layman and is provided with an extensive summary by Gove Hambidge.

The book is divided into five parts, entitled respectively:—climate as a world influence; climate and agricultural settlement; climate and the farmer; the scientific approach to weather and climate; climatic data, with special reference to agriculture in the United States. It is the second part which is of most direct interest to plant breeders, for in it the economic plants of the United States are considered, each in turn, in relation to climate and there are also general articles on climate and plants. The fifth and last part, which amounts to nearly half the book, is mainly concerned with the climate of the United States, but the rest of the book is of considerable general interest. There is a comprehensive index and abundant illustrations in the form of photographs, maps and diagrams.

The 1941 Yearbook Committee deserves congratulations and gratitude for this excellent production.

J. L. F.

575:633(41)

Agricultural research in Great Britain.

H.M. Stationery Office, London 1943: 1s. 6d. Pp. 100. (Cmd. 6421).

This small booklet presents a useful and succinct account of the research work in the agricultural sciences that is being pursued at the present time in Great Britain. In the section on Plant Breeding and Plant Genetics an outline is given of the work of the Plant Breeding Institute, Cambridge (cereals, sugar beet, mangolds, potatoes and Brassica); the National Institute of Agricultural Botany, Cambridge; the Welsh Plant Breeding Station, Aberystwyth (grasses, legumes, oats); the Scottish Society for Research in Plant Breeding (cereals, potatoes, herbage plants and roots); the John Innes Horticultural Institution (fruit trees); the Imperial Agricultural Bureaux (Empire Potato Collection); the Seale-Hayne Agricultural College (broccoli); and the South Eastern Agricultural College, Wye, Kent (hops). Reference to vegetable and strawberry breeding is also made in the account of the work of the Horticultural Research Station, Cambridge and to fruit breeding in the work of the Long Ashton and East Malling Research Stations.

GOLDSCHMIDT, R.

575.1:576.12

The material basis of evolution.

Yale University Press, New Haven and Oxford University Press, London 1940: 30s. Pp. xi + 436. 83 figs. 10 tables.

This book presents an elaboration of the material contained in the eight Silliman Lectures delivered by the author in December, 1939. It is commended to the attention of all geneticists and indeed all who are in any way concerned with the science or practice of breeding, whether of animals or plants. Many voices have been raised, especially in the last few years, against the views of the classical geneticists and neo-Darwinians; but few if any have the backing of such a body of experimental data and the authority of such a wealth of experience as that with which Richard Goldschmidt presents his case. Given as it here is, a lifetime's work and thought compressed within 400 pages, it is in its very redundancy almost overwhelming. The author discusses firstly micro-evolution which, he concludes, proceeds within the species by the accumulation of small mutations. These, however, never lead to the formation of incipient species or higher categories, which originate by single macro-evolutionary steps. A great weight of evidence is presented to show how a single change, e.g. one affecting the early embryonic processes, may affect the entire organism in just such a way as is characteristic for the differences between species, genera or higher orders. The changes in question often involve a difference in velocity of some process—e.g. a catalytic reaction, and have been well studied by many animal geneticists and physiologists; unfortunately the plant kingdom remains largely an unexplored field in this respect, and this may be the reason why the neo-Darwinian principles of speciation by selection and accumulation of unit differences are so slow to be uprooted. The role of selection is of course not denied; we read: "The formation of a *rassenkreis* of subspecies (including the still lower categories) is the method by which a species adapts itself to different local conditions within the area which it is able to inhabit. This adaptation, strictly within the limits of the species, is produced by micromutation in different directions, involving all known types of Mendelian inheritance of manifold morphological and physiological traits. Selection of pre-adaptational combinations accounts for everything else". The differences between true species however constitute something more profound, and are on a different genetic level, involving differences in reaction systems, instincts, etc., and there is a bridgeless gap between them.

Chromosome rearrangement is one of the suggested ways in which the major change producing species differences may be brought about. "More and more facts are accumulating, which show that the intimate serial pattern of the chromosome is important for the action of the hereditary material". Chromosome breaks which lead to new serial arrangements may produce definite genetic effects, which are not different from the typical effects of mutations. The effect of regrouping the components of a chromosome are compared with that of regrouping the components of many known chemical compounds; e.g. the male sex hormone, which has certain stereoisomers that are without any effect at all; changes of this kind can produce systemic mutations, not involving the creation of anything new but sometimes entailing immense phenotypic changes of a macroevolutional order.

It will be seen that all this may come about without the intervention of the gene as such and

the classical atomistic theory of the gene is not indispensable, it is found, either for genetics or evolution.

Such a view of evolution, arrived at from a study of the animal kingdom, is in striking consonance with those arrived at by careful studies of floral evolution by such careful observers as Willis and Guppy; it has the advantage of verisimilitude, in that a systemic mutation of the kind described leads at once so far toward the new type that selection can immediately be efficacious. The various improbable assumptions of the neo-Darwinians to explain the survival of the intermediate steps are thus no longer necessary. A change identical with many known mutations can often be produced also by purely environmental means such as alterations of temperature, hormones or other agencies which affect the velocity of reactions; these effects are known as phenocopies and provide a powerful example of how a complex macroevolutionary change can be produced by an exceedingly simple mechanism.

WHITE, M. J. D.

576.312

The chromosomes.

Methuen and Co., Ltd., London 1942 : 5s. 2nd ed. Pp. ix + 124. 25 figs. 7 tables.

The first edition of Dr White's valuable small monograph on chromosomes was reviewed in "Plant Breeding Abstracts", Vol. VIII, p. 198. The second edition differs from the first in that a short section on the chemical composition of chromosomes has been incorporated in Chapter II and the final chapter, on chromosomes and evolution, has been re-written. The term "centromere" has now been adopted but none of the mistakes noted in the above review of the first edition have been corrected. The same reservations are therefore necessary in recommending this otherwise admirable introduction to nuclear cytology.

J. L. F.

SALISBURY, E. J.

581.162

The reproductive capacity of plants. Studies in quantitative biology.

G. Bell and Sons, Ltd., London 1942 : 30s. Pp. xi + 244. 35 figs. 7 plates. 101 tables.

In spite of its importance in general biological theory, especially in relation to evolution and to ecology, the reproductive capacity of plants has rarely been studied quantitatively. Professor Salisbury deserves the gratitude of all botanists for the laborious work lying behind this book, which is invaluable both for the new light it throws on the problems of reproductive capacity and as a mine of useful facts.

It is not possible to give in this short review the general conclusions arrived at by the author. Regularities in the relationship between reproductive capacity and habit, habitat, distribution and mode of nutrition are disclosed by this extensive study, while rules which were previously widely, and perhaps too easily accepted, go by the board. The application of the results of this pioneering work to cultivated plants will present many interesting problems and it is to be hoped that the author's concentration on wild plants will not deter other workers from taking up these problems.

J. L. F.

LAING, R. M. and

BLACKWELL, E. W.

581.9(93.1)

Plants of New Zealand.

Whitcombe and Tombs, Ltd., London, Australia, New Zealand 1940 : 21s. 4th ed. Pp. xvii + 499. 191 figs.

Without aiming at the completeness of a flora, "Plants of New Zealand", should enable the visitor and the student of natural history to identify and learn something of interest about the plants likely to be encountered there. The text is made up of discursive notes on features of botanical or human interest, brief descriptions of species and a number of diagnostic keys. It is profusely illustrated with photographs and colour plates and provided with a glossary and an index. That it has run into four editions shows that it fills a need.

J. L. F.

NEEDHAM, J. and
DAVIES, J. S. (Editors)

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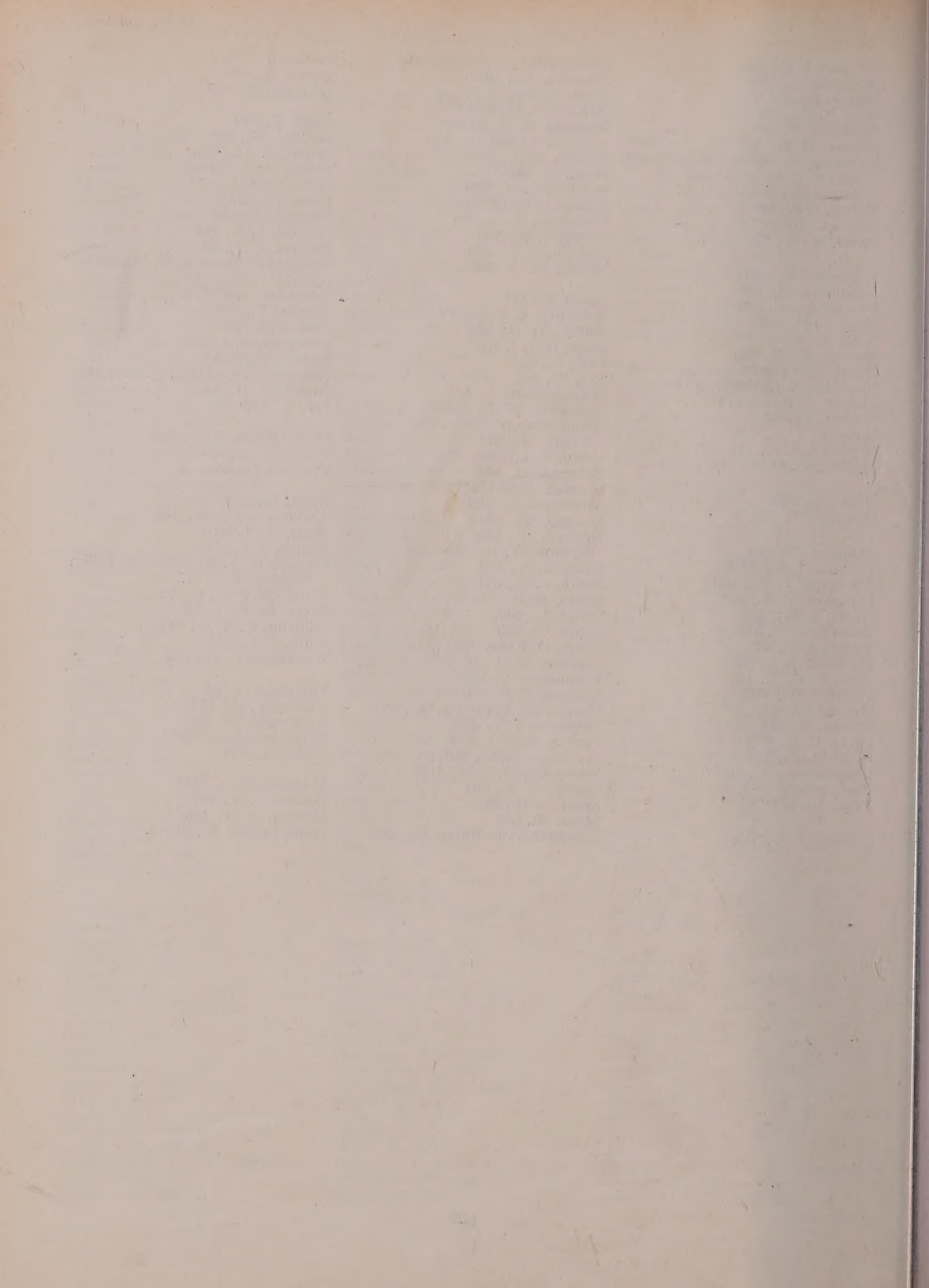
Science in Soviet Russia.

Watts and Co., London 1942 : 1s. 3d. Pp. 65.

In this small booklet edited by Joseph Needham and Jane Sykes Davies, Dr Needham himself contributes an article on Biological Science in the Soviet Union, which includes references to the work of Soviet geneticists such as Koltzov, Iljin and Vassin, as well as a very succinct outline of the "genetics controversy". Special emphasis is laid on the advantage that research in the U.S.S.R. gains over research in most other countries on account of the greater mechanical facilities afforded to it.

The chapter on "Soviet Agricultural Science" by Arthur Walton is devoted to the development and expansion of the so-called "pyramid of research personnel" in the investigation of purely practical agricultural problems.

The booklet also contains articles on Soviet physical, medical and other applied sciences.



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